EVALUATION OF THE EFFECT OF AUDIOVISUAL MODELING ON THE ANXIETY, FEAR AND BEHAVIOUR OF PEDIATRIC DENTAL PATIENTS

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CERTIFICATE

This is to certify that this dissertation titled "**EVALUATION OF THE EFFECT OF AUDIOVISUAL MODELING ON THE ANXIETY, FEAR AND BEHAVIOUR OF PEDIATRIC DENTAL PATIENTS**" is a bonafide record of work done by **DR. MADHULIKA INJETI,** under my guidance during her postgraduate study period between **2009 – 2012**.

This dissertation is submitted to **THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY**, in partial fulfillment for the degree of **Master of Dental Surgery in Branch VIII – Pedodontics and Preventive Dentistry**.

It has not been submitted (partially or fully) for the award of any other degree or diploma.

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INTRODUCTION

"Although the operative dentistry may be perfect, the appointment is a failure if the child departs in tears." - Mc Elory (1895)

Behaviour management of a child is a prerequisite to provide good dental care. This process involves not only the child as an individual but also the child's family. The relationship between the child, the child's family and the dental team is a dynamic process. The paediatric treatment triangle depicts the interrelationship between the child patient, the parent as well as the dentist.[1] In addition, the influence of society on the management and treatment of the child also plays a role.[2] The pedodontist should understand the interaction between these various factors and be able to tackle them effectively in order to provide appropriate behaviour management and treatment.

It is estimated that 6-15% of people avoid regular dental care because of dental anxiety or phobia.[3] It has been established that dental anxiety is most likely to start in childhood.[4] Each child is a unique combination of environment and hereditary factors. The aetiology of a child's dental anxiety can be multifactorial. Various causes have been proposed which include, direct or indirect influences of the past experiences of child and his or her family members and peers. Other factors which have a mediating role on the development of a child's dental anxiety or fear are the child's developing personality, temperament and trait anxiety.[5-9]

Children have relatively limited communication skills and are less able to express their fears and anxieties. These factors observable at a very young age play an important role in the occurrence of dental anxiety and the concomitant development of behaviour management problems, especially if not adequately managed. Behaviour management problems in children are essentially a reflection of their inability to cope with their anxiety. When children cannot cope, they attempt to escape the impending event. The subsequent change in behavior seen is often a manifestation of anxiety or discomfort in a child who has no other way to cope or of informing you of their difficulty. Furthermore, the effects of this anxiety have been shown to persist into adulthood which can often lead to dental avoidance and the subsequent deterioration of oral health. Alleviating a child's anxiety about dental treatment is important not only in mitigating the immediate fear but also in preventing apprehension continuing into adulthood.[10]

The role of a dentist in managing a child with anxiety is twofold - firstly, to control and treat the problem with which the child reports and secondly, to teach the child appropriate ways of managing the anxiety.[11] In order to relieve the child's anxiety, the dentist should be able to identify and implement appropriate management techniques which require thorough knowledge in this field. Behavior management aims to give children appropriate coping strategies. Wright in 1975 defined Behaviour management as the means by which the dental team effectively and efficiently performs treatment for a child and at the same time, instills a positive dental attitude.[2]

He suggested that a "positive dental attitude" was the aim of behavior management.[1] Behaviour management has been defined by the American Academy of Pediatric Dentistry as "a continuum of interaction with a child/parent directed toward communication and education".[12]

There are a number of non-pharmacological or psychological techniques that aim to manage patient behaviour. Behavior management methods are about communication, education, shaping and motivation. Some methods aim to improve the communication process, while others are intended to eliminate inappropriate behaviour or reduce anxiety. Most recommended techniques for modifying child behaviour during dentistry have involved various forms of pre-exposure to the dental setting and procedures.[13] The American Academy of Pediatric Dentistry had outlined behaviour management methods for use with children including voice control, tell-show-do, positive reinforcement, distraction and non-verbal communication, hand-over-mouth (HOM) technique and physical restraint and pharmacological interventions such as conscious sedation, nitrous oxide, and general anesthesia. To the AAPD list, Kuhn and Allen added three more techniques: (i) Contingent distraction, (ii) Modeling and (iii) Contingent escape.[14]

Many studies have been conducted using different behaviour management techniques, with varying results. Cherches and Blackman reported the efficacy of home preparation for the dental visit; friendly greetings from the dentist and assistants; the use of books, movies, and slides as distracting entertainment; and the

use of the Tell, show, do method.[15] Allen , Stark L, Rigney, Nash and Stokes in 1988 found reinforcement with praise, temporary escape and stickers to be effective in management of 3-year-old children undergoing restorative dental treatment.[13] Kohlenberg, Greenberg, Reymore, and Hass in 1972, reported shaping and edible reinforcers such as fruit juice to be effective in the management of severely retarded persons.[16]

Most dental procedures require coping strategies from our patients which need to be explained and learned. For children this requires small clear steps. This process is termed behavior shaping. Behavior shaping is defined as the procedure which slowly develops behavior by reinforcing a successive approximation of the desired behavior until the desired behavior comes into being.[1] It consists of a defined series of steps towards ideal behavior. Behaviour shaping includes desensitization, modelling and contingency management.

Many Behaviour Shaping techniques are based on the principle of learning, such as the Social Learning Theory which emphasizes the importance of observing and imitating the behaviors, attitudes, and emotional reactions of others. This is rooted in many of the basic concepts of traditional learning theory.[17] Bandura established that Modeling or learning by observation worked not only for acquisition of new behaviors but also for reducing undesirable behavior. One of the primary principles of this technique is Vicarious Extinction, wherein, "fearful and avoidant behavior can be extinguished vicariously through observation without any adverse

consequences accruing to the performer". This technique hence allows for "learning without performance" and thus the child learns to eliminate fearful behavior without incurring the aversive consequences of such behavior.[17-19]

Several studies have demonstrated the effective use of therapeutic modeling to reduce children's anxiety in various situations. In the dental set-up, case studies in which a live peer model was used to demonstrate positive behaviour during dental treatment have succeeded in reducing the uncooperative behaviour of fearful children.[17]

The first empirical study on modeling in dentistry was done in 1969 by Ghose and associates, wherein, a group of children who observed an older sibling undergo dental treatment prior to their own treatment, exhibited more positive behavior than the control, during both treatment visits, including during injections.[20] Machen and Johnson, in 1974, found more positive dental behaviour in children exposed to Videotape Modeling and Desensitization prior to treatment, compared to a control group.[21] In a study by Melamed, Weinstein, Hawes and Katin-Borland, in 1975, Children shown a film about a child successfully undergoing dental treatment, showed far lesser disruptions than children who saw an unrelated film.[10] Stokes and Kennedy found that children having severe management problems, on exposure to peer modeling, showed substantial decreases in disruptive behaviour. [22]

Although previous studies report the successful use of Modeling in reduction of anxiety as well as behavior management problems, there are very few reports about

the influence of Modeling in the present scenario wherein, children are exposed to a multitude of influences through other means such as various forms of mass media, in addition to their own dental and medical experiences. These factors influence both the child's initial perception as well as responses to the dental situation.

The purpose of this study is to evaluate the effect of Modeling on the fear, anxiety level and behavioural responses in young children and also to compare the effect of exposure to Audiovisual (Filmed) Modeling with exposure to a film unrelated to dentistry and no film exposure prior to treatment, in reducing children's anxiety, fear and uncooperative behaviour during dental treatment.

AIMS & OBJECTIVES OF THE STUDY

1. To assess the effect of Audiovisual (filmed) Modeling on child's fear, anxiety level & behaviour.
2. To compare the effect of exposure to Audiovisual (filmed) Modeling with a film which is unrelated to dentistry and Control group (no video) on the child's fear, anxiety levels and behaviour.

REVIEW OF LITERATURE

Locker, Liddell, Dempster and Shapiro et al in 1998[4] conducted a study to identify the age of onset of dental anxiety and the differences by age of onset with respect to potential etiological factors, such as negative dental experiences, family history of dental anxiety, and general psychological states in persons aged 18 years and over living in the City of Etobicoke. Of the 1420 subjects who returned questionnaires, 16.4% were dentally anxious. Over half, 50.9%, reported onset in childhood, 22.0% in adolescence, and 27.1% in adulthood. Logistic regression analyses indicated that negative dental experiences were predictive of dental fear regardless of age of onset. Adolescent-onset subjects were characterized by trait anxiety and adult-onset subjects by multiple severe fears and symptoms indicative of psychiatric problems. The three groups were similar in terms of their physiological, cognitive, and behavioural responses to dental treatment. However, adolescent and adult onset subjects were more hostile toward and less trusting of dentists. These results indicate that child-onset subjects were more likely to fall into the exogenous etiological category while adult-onset subjects were more likely to fall into the endogenous category.

Rasa Raciene et al in 2003[23] conducted a study to evaluate the incidence of dental fear among adolescents in the city of Vilnius on the basis of the CDAS (Corah Dental Anxiety Scale), DFS (Dental Fear Survey) and DBS (Dental Beliefs scale) scales and establish the determining factors of this phenomenon. The study included 557 pupils aged between 12 and 15 years from 9 different schools, who have had experience at a dentist's office. According to CDAS and DFS all study participants

were divided into three groups: those experiencing low fear, (CDAS ranging from 4 to 8, DFS from 24 to 55); moderate fear (CDAS 9 –14, DFS 56-88) and high fear (CDAS from 15 to 20, DFS-89-120). The respondents filled anonymous questionnaires and upon the assent of the pupils and their parents had their dental condition examined. The researchers examined the pupils' oral cavity in natural light and established DMFS and OHI-S. The survey found that CDAS was 9.91(S.D. 3.03) among the pupils of Vilnius, nearly equal to the CDAS among adolescents of similar age in other countries. The most significant contributors to dental fear among adolescents were the sight of the anaesthetic needle (20.3 percent), feel of the anaesthetic needle (18.8 percent) and drill vibration (16.1 percent). A correlation was found between CDAS, DFS, DBS and dental experience. A correlation was established between DBS and dental decay (r = .158**), but there was no statistically significant relation with other dental fear indicators.

Rãducanu, Feraru, Herteliu, Anghelescu et al 2009[24] conducted a study on 134 patients aged between one and eighteen years (68 girls and 66 boys) to evaluate dental fear/anxiety in children and adolescents, and the factors that lead to their appearance. Dental fear and anxiety (DFA) were measured from the dentists', the patients' and the parents' perspectives, using the Facial Image Scale (FIS). The results of the DFA evaluation were correlated with the children's dental behavior, which was estimated using the Frankl's Behavior Rating Scale. The results of the study showed that twenty-nine (21.6%) children reported FIS scores of 4 or 5 in their auto-evaluation in the dental chair. Fourteen (10.4%) reported extreme dental fear. The frequency of dental fear in girls (extreme dental fear=9.0%) was greater compared to that in boys (extreme dental fear=1.5%), the gender differences in fear were not

statistically significant. The main causes of DFA reported by the children were fear of pain and generalised fear of doctors in general and dentists in particular. The agreement level between the evaluation of the state of fear assessed by the doctors/parents and the patients' self-evaluation, measured using Cohen's Kappa, was poor. The authors concluded that the assessment of dental fear is an extremely useful tool for the dental practitioner, who can use it to customize behavioral treatment and management for individual patients.

Skaret E, Berg E, Kvale G, Raadal M in 2007[25] conducted a prospective study to explore and compare psychological characteristics in two groups of 18-year-old adolescents, those subjects reporting no likelihood of visiting the dentist in a situation with toothache (avoiders); and those who definitely would see the dentist in the same situation (non-avoiders). The study included a representative sample of 1385 18-year-old adolescents attending high schools in the county of Hordaland, Norway. Data were collected by use of questionnaires completed in classrooms. A total of 47 subjects (3.4%) reported no likelihood of going to the dentist in a situation with toothache (avoider group), 2.9% of the girls and 4.1% of the boys, compared to 425 subjects (30.7%) who reported that they would definitely go in the same situation (non avoider group) (33.5% of the girls and 27.3% of the boys).The following factors increased the risk of being included in the avoider group: negative beliefs of the dentist (communication, trust and control) (OR = 4.3), high dental anxiety (OR = 3.5), and being a male (OR = 2.4). No predictive power for being included in the avoider group was found for general self-efficacy, coping style, multiple fears, or anxiety and depression. The authors concluded that avoidant adolescents report more negative beliefs of the dentist and higher dental anxiety compared to subjects reporting that

they definitely would visit the dentist, and that males have a higher risk than females to be included in the avoider group.

Tickle M, Jones C, Buchannan K, Milsom KM, Blinkhorn AS and Humphris GM in 2009[26] conducted a prospective cohort study with 799 children who were followed from 5 to 9 years of age to measure changes in dental anxiety over time and to examine the relationship between anxiety, dental care, and other factors. The participants were clinically examined and their DMFT values for the primary dentition were noted. The parents of these participants completed the a questionnaire containing a measure of anxiety when the child was 5 years and again when the child was 9 years. The results indicated that the majority (54.3%) of participants who were anxious at 5 years were no longer anxious at 9 years, but a large proportion of children who were anxious at 5 remained anxious at 9 years of age (45.7%). During the follow-up period, a larger proportion of children developed anxiety (11.7%) than the proportion of children who were reported as being anxious at baseline (8.8%). At 9 years of age, the significant factors influencing dental anxiety were gender (females were found to be more anxious than males); parental anxiety; a history of extraction; and irregular, asymptomatic dental visiting. These factors were also significantly associated with dental anxiety at 5 years old. The authors reported that dental anxiety was cumulative in the study population over time, and its development influenced by multiple variables. The results suggested that adverse conditioning and vicarious learning are both important in the development of this condition.

Holst A, Schröder U, Ek L, Hallonsten AL, Crossner CG in 1988[27] conducted an investigation to study non-dental and dental background variables with a view to estimating their influence on behavior management problems by means of a

structured interview and analyzing their separate and combined predictive power. The study sample included an experimental group consisting of 101 children aged 3-16 years, referred for management problems to clinics of specialized pedodontics, and a control group, individually matched with the cases as regards age, sex, residential area, number of tooth surfaces restored, and dentist. The children or their parents were interviewed concerning background variables. Logistic regression was used for the analyses. Three non-dental variables turned out to be statistically significant as predictors (P less than 0.05): problems on visiting a medical doctor, dental fear in the mother or father, and anxiety when meeting unfamiliar people. The authors stated that management problems might be expected if one of these attributes is found. Four dental variables had significant predictive power: earlier problems on seeing a dentist, dislike of the dentist, not enough time to adjust to the dental situation, and fear of injection. However, none of these dental variables was found to have predictive power in 3-6-yr-olds, and none of them improved the predictive power of the three main non-dental variables.

Brill WA in 2001[28] conducted a study to determine the difference in the behavior of children undergoing restorative dentaltreatment atthe first office visit versus those whose first restorative treatment visit was after an initial non-threatening dental visit in a private pediatric dental practice. 399 patients up to and including age 9 presenting to the dental practice for their first dental experience, who required restorative dental treatment without pharmacological aides were included in the study. 289 of them, had restorative treatment delivered immediately after the new patient work up which consisted of clinical examination, radiographs when indicated and achievable, home care instructions dietary counseling, prophylaxis and topical

fluoride. The remaining 110 patients had their first restorative session at a later date after the new patient work up, usually within two weeks of the initial visit. For all the patients, behavior was recorded during the restorative session using the Sarnat scale. Variables such as age, method of payment, referral source and sex were also recorded. The results showed that there was no statistically significant difference in the behavior of children, between those who had the first restorative dental experience at the initial office visit versus those children who had the first restorative procedure after a non-invasive introductory visit in all instances. There were no differences according to age, sex, socio-economic status or source of referral. The author concluded that a child may not exhibit more negative behavior as a restorative dental patient when the first visit is for restorative therapy than if the restorative treatment is delivered at a later date after a non-threatening introduction to the dental environment and hence, a pediatric dentist need not hesitate to treat a child at the first visit for fear that it may engender more negative behavior than if the restorative dental treatment was postponed until another time.

Berggren and Linde et al 1984[29] in their study compared two types of treatment modalities in 99 subjects belonging to the lowest social class, referred for specialist treatment because of dental fear and avoidance. The first was behavioral therapy (BT) from a psychologist and the other was a treatment done by general anesthesia. Both were followed by adjusted conventional dental treatment using perceived control and re-attribution of negative stimuli. The two groups of patients were identical in all respects studied except for alcohol and drug abuse, which was more common in the GA group. Among BT patients, significantly more (92%) completed the treatment program, compared with the GA patients (69%). Complete

oral rehabilitation in community dental clinics was achieved by 78 and 53%, respectively. Patients' self-reported tension and the dentists' ratings of patient behavior during treatment were also significantly more positive for the BT groups. A significantly higher frequency of patients treated with behavioral therapy completed the treatment program at the special clinic for dental fear treatment, in comparison with patients treated with general anesthesia ($p < 0.05$). The study clearly showed that the behavioral treatment modality is superior to treatment under general anesthesia in several respects.

C Vishnu Rekha, Ponnudurai Arangannal, Mamta Nichani and Latha Nirmal[30] in 2011, conducted a survey of pediatric dentists and general dentists in Chennai city regarding their use of behavior management techniques. Surveys were mailed to all the pediatric dentists and general dentists in Chennai. The survey contained items on the use of six non pharmacologic and two pharmacologic behavior management techniques. Information was also obtained on parental presence in the operatory. A majority of pediatric dentists (60%) indicated that they use tell-show-do; many (25%) use a combination of both tell-show-do and communication; few of the pediatric dentists (10%) use distraction and a few others (5%) use modeling (filmed) technique. HOME, active and passive immobilization and communication alone have not been used by any of the pediatric dentists. The majority of general dentists (76%) reported the use of physical restraints, 17% stated that they communicate with children to manage them and only 7% of them use tell-show-do. Pharmacological strategies for behavioral management were widely used by pediatric dentists when compared to general dentists. Most pediatric dentists (90%) indicated the use of general anesthesia for

uncooperative patients. Few of the pediatric dentists (10%) indicated the use of conscious sedation. Parental presence in the operatory appeared to be a common practice for very young children in case of pediatric dentists.

Ramos-Jorge ML, Ramos-Jorge J, Vieira de Andrade RG and Marques LS in 2011[31] carried out a controlled trial to determine whether exposing children to images of positive dental care would have an effect on their degree of anxiety, assessing anxiety three separate times. 70 participants from 4-11 years of age were randomly assigned to one of two conditions. The intervention consisted of viewing positive images of dentistry and dental treatment (n=35). The control condition consisted of dentally neutral images (n=35). Anxiety was assessed using the Venham's Picture Test (VPT) prior to the intervention, immediately following the intervention and following the dental appointment. Statistical analysis was conducted blind to group allocation. No significant difference was detected between the scores of the VPT in the two groups at any evaluation time ($p>0.05$). Dental anxiety at the three evaluation times was not correlated to age. There was no difference in level of anxiety between male and female participants ($p>0.05$). The authors concluded that viewing positive images of dentistry and dentists did not have a greater effect on child anxiety in the dental setting than viewing neutral images, however, showed lower rates of anxiety for all children although this was not significant.

Stark LJ, Allen KD, Hurst M, Nash DA, Rigney B, Stokes TF in 1989[32] investigated the utilization and efficacy of distraction in reducing the anxious and disruptive behaviour of 4 children between 4-7 years of age undergoing dental treatment. During the distraction procedure, the children were shown a poster and told a story about it during dental treatment. They earned a prize if they attended to the

poster and story and could correctly answer questions about them following each intervention visit. The children's disruptive behaviour was assessed via direct observation, and results were analyzed within a multiple baseline design. The children exhibited high levels of anxious and disruptive behaviour across baseline visits, regardless of the length of time in treatment or number of visits. Following the introduction of the distraction intervention, all children demonstrated an immediate decrease in overall disruptive behaviour during the first distraction visit. Child 1 showed a decrease in disruptive behaviour from an average of 60% during baseline visits to 6% during distraction. Child 2 showed a decrease from 49% to 15%. Child 3's disruptive behaviour decreased from an average of 50% to 19% and Child 4 showed a decrease from 47% to 29%. Further, For Child 1 and 2, disruptive behavior during the injection was lower than on previous visits. This was accompanied by the children meeting the criterion for correct answers on the distraction quiz.

Aitken JC, Wilson S, Coury D, Moursi AM in 2002[33] conducted a study to determine if audio distraction could decrease patient anxiety, pain and disruptive behavior during pediatric dental procedures. Forty-five children between the ages of 4 to 6 years had two visits each involving restorative dentistry with local anesthesia in a mandibular quadrant. Visit 1 was a baseline session for all patients. During visit 2, the children were assigned to either an upbeat music group, a relaxing music group or a no music group. Variables measured were: (1) parent-reported anxiety via the Modified Corah Anxiety Scale, (2) self-reported anxiety via the Venham's picture scale, (3) heart rate, (4) behavior via the North Carolina Behavior Rating Scale and (5) pain via a visual analogue scale. No significant differences were found among the three groups during experimental visit #2 across any variables. A majority of patients

(90%) stated that they enjoyed the music and would like to listen to it during their next visit. The authors concluded that Audio distraction was not an effective means of reducing anxiety, pain or uncooperative behavior during pediatric restorative dental procedures. However, patients did enjoy listening to the music during their visits.

Prabhakar A.R, Marwah N and **Raju OS in 2007**[11] conducted a study to evaluate and compare audio distraction and audiovisual distraction in the management of anxious pediatric dental patients. The study was conducted in India where 60 children aged 4-8 years with no previous dental experience were included. Children were divided into three groups of 20 each. Group A was control group, group B listened to audio presentation through head phones throughout the procedure and group C children were shown audiovisual presentation through television throughout the dental procedure. Child's anxiety level was assessed using Venham's picture test, Venham's rating of clinical anxiety, pulse rate and oxygen saturation. The results of the study showed that anxiety was maximum during dental extraction and audiovisual distraction technique was the most effective in managing pediatric dental patients as compared to audio distraction ($P<0.05$). Based on the results, audiovisual modeling was recommendation as one of the most effective methods for distraction and to reduce dental anxiety in children.

Allen and Stokes in 1987[13] studied the efficacy of a reinforced practice procedure in facilitating cooperative behaviour in five children, aged 3 to 6 years, during dental treatment. The subjects were shown to exhibit excessive levels of disruptive behaviour as rated during previous dental visits. In a multiple baseline design across subjects, the children underwent a reinforced practice session and were rewarded with escape, inexpensive stickers, and praise for cooperative behaviour in

the presence of the sights, sounds, and some sensations of the dental instruments prior to actual dental treatment. Six dental procedures were scored according to a modified dental procedure code developed by Williams et al. These included exploration, water/suction, injection, placement of the rubber dam, drilling, and restorative procedures. The occurrence of four categories of disruptive behaviour (head and body movements, crying/gagging/moaning, and physical restraint) were observed and scored during 1 5-s intervals. Heart rate and blood pressure readings were recorded at 2 min intervals. Results showed that indicated baseline levels as high as 90% were reduced to less than 15% by the final treatment visit. In addition, the procedure was effective in reducing overall heart rate and blood pressure reactivity to dental treatment. All children were rated by the involved dental professionals as more cooperative and relaxed following exposure to reinforced practice.

Melamed, Hawes, Heiry and Glick in the year **1974**[10] conducted a study to evaluate the effect of modeling on16 children aged 5 to 11 years, with no previous dental experience. The children were randomly assigned to the experimental modelling or control group, and made at least two visits to the clinic. The first visit consisted of two treatment sessions. The first session consisted of prophylaxis, the second session during this first clinic visit consisted of examination by the dentist, and the third treatment session, one week later, involved the restoration of at least one carious tooth. During the second visit, each child viewed either an experimental modeling film or a control film before the restorative treatment. The 13-minute experimental videotape showed a 4 year old black child experiencing a typical dental procedure and being verbally and materially reinforced for exhibiting cooperative behavior. The control film, of comparable length, portrayed a similar young black

child involved in activities unrelated to dentistry. Each child's anxiety and behavior was rated using the Child Fear Survey Schedule –Dental Subscale, Palmar Sweat Index and the Behaviour Profile Rating scale before and after each session. No significant differences were found between the experimental and control groups mean ratings for the first two sessions. However, the experimental group's mean behaviour profile rating for the third treatment session (2.68) was significantly lower than that of the control group (9.30). The trends in the PSI scores are toward greater reduction in arousal for the experimental group from before to after the film presentation, and from before film to after treatment. The CFSS scores suggested a greater decrease in self-reported fears for the modeling group than for the control group. The results indicated that the presentation of a filmed peer model displaying positive, coping behavior during a dental visit is effective in reducing disruptive behavior in children who are experiencing their first dental treatment.

Melamed BG, Weinstein D, Katin-Borland M and Hawes R, in **1975**[34] studied the effect of Filmed modeling on the modification of anxiety-related disruptive behavior in dental treatment. Matched groups of 5 to 11 year old inner-city children attending a pedodontic clinic were divided in to Modeling and Control groups. The Modeling subjects were shown a videotaped demonstration of a 4-year-old black child undergoing a dental restorative procedure. The model in the video underwent a restorative procedure with a friendly dentist, who responded to his coping behavior with praise, and by giving a toy at the end of the session. Children in the control group drew were given an unrelated drawing task to be completed in the same videotape room before dental treatment. The children's behavior during subsequent procedures of radiography, prophylaxis, and restorative treatment was

documented by use of a behavior profile rating scale. Results showed the disruptive behavior of the experimental subjects to be significantly lower than that of the children in the control groups.

Fields and Pinkham in the year **1975**[35] conducted a study the effect of videotape modeling on 24 children of the age 3 to 5 years, with no previous dental experience, one week before their first dental visit. The subjects were randomly assigned to one of three experimental groups. Group 1 had no previous exposure to a dental office and reception room before their examination visit. Group 2 consisted of children who visited the reception room one week before their examination appointment. The child remained in the reception room while the mother filled out health and family history questionnaires. Group 3 or the modeling group also visited the reception room one week before their examination appointment. The child was separated from his mother and escorted to another room to view a seven minute videotape showing a 3 ½ year old child who was reinforced verbally for showing co-operative behavior while undergoing a simulated intraoral examination, pumice prophylaxis, administration of local anesthetic, and restorative procedures completed under rubber dam. All the subjects experienced three treatment visits. Visit one included examination, radiographs, and prophylaxis. The second and third visits involved completion of one restoration under local anaesthesia. All cooperative behaviour was reinforced verbally. Each child's behaviour in the dental situation was evaluated by the Frankl's behaviour rating scale at regular intervals. Results showed that the modeling group had fewer patients with any negative behaviour (25%) than did group 1(75%) and 2(63%) but the difference was not significant. However, when assessed by an analysis of covariance using maternal anxiety as the covariate, a

significant difference was found between the modelling group and the reception room group for the behaviour-rating observation of separation from the mother. The modelling group had significantly more positive behaviour.

Klingman A, Malamed B G, Cuthberg M I and Hermecz D A in 1984[36] assessed the contribution of active participant modeling in coping skills training by evaluating 2 critical process variables: the retention of information about the threatening events and how to cope with them, and the visceral component of imaginal rehearsal. 38 children aged between 8–13 years, highly fearful of dentists based on their ratings on the Dental subscale of the Children's Fear Survey Schedule, were shown a videotape of 2 children practicing controlled respiration and imagery techniques while undergoing dental treatment. The subjects were divided into two experimental groups, the participant modeling group and the symbolic modeling group. The participant group was encouraged to practice these as they watched the film, whereas the symbolic group was told that this might help them during their own dental treatment, which immediately followed videotape preparation. Subjects who had the active participant instructions obtained more information from the videotape, reported greater reduction in dental anxiety, and showed lower respiratory rates as they watched the videotape. They reported greater use of imagery techniques and enhanced self-control. The degree of disruptiveness was significantly lower during subsequent actual dental treatment in subjects from the active practice group.

White, Akers, Green, and Yates in 1974[37] studied the effect of Live Modeling. The children in this study observed a rehearsed “confederate” patient from behind a one-way mirror. Observations occurred on six occasions over a3-wk period. The modelling group observed the child undergoing various treatments; one control

group observed a dentist who named and manipulated the dental equipment; a second control group did not observe any dental setting. The dentist employed a checklist of approach behaviours (e.g., opened mouth, allowed anaesthetic) and avoidance behaviours (e.g., crying, restless in chair) to document the behaviour of the children during dental appointments. The modeling group procedures were shown to be significantly superior to the control groups as measured by the cooperation of the children.

McMurray, N. E., Lucas, J. O., Arbes-Duprey, V. and Wright, F. A. C. in1985[38] investigated the effects of two types of modeling videotapes, mastery and coping, on anxiety and disruptive behavior in 5-7-year-old children undergoing a restorative dental procedure. Results indicated that both treatment videotapes were more effective in reducing self-report anxiety than was a placebo tape. There was no difference between the mastery and coping tapes in reducing anxiety. No differences were found between groups on the measure of disruptive behavior.

Conyers et al in 2004[39] conducted a study to assess the effectiveness of in vivo desensitization and video modeling, in participants with severe or profound mental retardation. Six participants in the severe to profound range of mental retardationexhibiting excessive avoidance of dental procedures defined as disruptive and inappropriate behaviour, participated in the study. 3 participants received desensitization and 3 participants received video modeling. During baseline evaluation, at periodic intervals during treatment, the participants' compliance was assessed with an 18-step task analysis associated with a dental examination. For the In vivo desensitization group, the dentist and staff gave the participant enthusiastic praise, encouragement, and verbal and physical prompts throughout each task analysis

step. When the participant appeared relaxed and calm at one step, he or she was prompted to complete the next step. The session continued until the participant refused to complete a step in the task analysis. For the Video modelling group, the participants were allowed to watch a 15-min video of a person exhibiting appropriate behaviour during each step of the task analysis and receiving praise for appropriate behaviour. The participants watched the video on two separate occasions and then participated in the task analysis session. Desensitization increased compliance for all 3 participants, whereas video modeling increased compliance for only 1 of 3 participants. The findings suggested that desensitization may be successful in promoting compliance with dental procedures in persons with mental retardation and that video modeling is much less effective. In addition, this study also demonstrated that compliance with dental procedures did not improve after the participant was repeatedly exposed to a dental environment or a simulated dental exam.

Farhat-McHaylehet al in 2009[40] performed a comparative study between Live Modeling and Tell–Show–Do using heart rate measurements during treatment as a biological parameter to indicate and measure anxiety and fear. The study children which consisted of 155 children aged between 5 to 9 years were divided into 3 groups: A, B, C. Groups A and B were prepared for dental treatment by means of live modeling by their mother and father respectively, Group C were prepared by a pediatric dentist using the tell–show–do method, following which each child's heart rate was monitored during treatment, which consisted of an oral examination and cleaning.Each child's heart rate was monitored during the entire treatment (oral examination and cleaning) with a pulse oximeter. Each child's heart rate was monitored during the entire treatment with a pulse oximeter.The results showed that

Average heart rate over the entire treatment period was significantly lower among children in group A (live modelling by mother) than among those in group B (live modelling by father; $p = 0.034$) and group C (tell–show–do method; $p = 0.005$)

Rouleau et al in 1981[41] conducted a study to verify and study the efficacy of two forms of pre-exposure to dentistry (direct and filmed) which were identical in content and mode of exposure. They were identical in situations like the dental office, dental instruments, and the sequential treatment described by the dentist. These two forms of pre-exposure were given to 38 children with no previous dental exposure, aged between 4 and 6 years, from 4 dental schools distributed all over Canada. The subjects were randomly assigned to one of 4 groups - three experimental groups and a control group according to age and sex. Group 1: The subjects in this group viewed a videotape lasting eight min showing a positive presentation of the dentist and dental set up. After watching the film, each child reported to the experimenter what he/she saw in the film. Group 2: This group was identical to Group 1except that, at the end of the question period following the viewing, the experimenter suggested that the children view the film again. The second period of questions and verbalizations was similar to the first. Group 3: These children underwent one direct pre-exposure. The direct stimulus pre-exposure in this group was similar to the filmed pre-exposures, except that it was done in vivo. The session was terminated by a question period like that of the preceding groups. Group 4: (Control) These subjects viewed a film in which the subject matter was not adapted to the dental visit. The total number of positive verbalizations was similar in all groups who received pre-expositions. These experimental groups obtained better scores than the control group. Also the experimental groups tended to exhibit fewer negative verbalizations than the control

group. Finally, there was a smaller amount of agitated behaviour in the direct exposure group than in the control group.The results which were evaluated by dentists, judges and by both dentists and judges together were not statistically significant but they found that the experimental groups obtained better scores than the control group.

Holmes RD, Girdler NM in 2005[42] conducted a study to determine the validity of subjective anxiety assessment on the outcome of management of children receiving operative dental treatment. One hundred children and adolescents aged between 8 and 15 years participated in the study. Clinicians subjectively allocated 50 children for treatment with local analgesia alone (low anxiety), and identified 50 children who had the potential to benefit from nitrous oxide and oxygen sedation (high anxiety). Participants then completed the State-Trait Anxiety Inventory for Children (STAIC), the Venham's Picture Test (VPT) and the Children's Fear Survey Schedule-Dental Subscale (CFSS-DS). A global rating scale classified behavior during dental treatment. State anxiety and dental fear prior to treatment were significantly higher in children allocated to receive inhalation sedation (P = 0.004 and P = 0.005, respectively). There was no significant difference in trait anxiety or post-treatment state anxiety between the two groups (P = 0.69 and P = 0.06, respectively). Only 11% displayed 'negative' behavior during treatment: 82% of this group represented those allocated to receive sedation. Children receiving inhalation sedation were significantly more anxious prior to treatment than children receiving treatment with local analgesia alone. The study findings support the subjective assessment of anxiety in children; however, objective anxiety measures may assist clinicians in identifying specific fears, which may ultimately aid patient management.

Ten Berge M, Hoogstraten J, Veerkamp JS and Prins PJ in 1998[43] conducted a study on 150 Dutch children aged 4 to 12 years to report on the factor structure of the Dutch parental version of the CFSS-DS. The parents of the selected children completed the CFSS-DS since younger children were unable to complete the questionnaire by themselves. To test the internal consistency of the Dutch translation of the scale, Reliability analysis (alpha) and Factor analysis were employed. The mean total CFSS-DS score was 27.0. No relationship was found between age and the total score, whereas, gender and the total score was found to be interrelated; girls had higher fear scores than boys. Factor analysis demonstrated a factor pattern showing 3 factors: 1) fear of highly invasive dental procedures, 2) fear of less invasive aspects of treatment and 3) fear of medical aspects. Considering that almost all items load substantially (> or =0.20) on more than one factor, it was found that one primary underlying dimension exists: fear of invasive treatment aspects. The internal consistency of the Dutch parental version of the CFSS-DS proved to be good (Cronbach's alpha – 0.90). The CFSS-DS was proposed as a reliable and stable measure of dental fear irrespective of the children's age, situational or cultural factors.

Arapostathis KN, Coolidge T, Emmanouil D and Kotsanos Nin 2008[44] conducted a study on 260 children aged 4-12, to evaluate the psychometric properties of a Greek version of the CFSS-DS. The completed the Greek version of the CFSS-DS while in the waiting room of a pediatric dentist. The dentist, who was unaware of the children's scores, rated the children's behavior during the dental appointment using the Frankl scale. Children who returned for a second dental appointment during the study period completed the CFSS-DS a second time. The mean CFSS-DS score was 24.80. Age and gender were found to be unrelated to mean scores. Invasiveness of

dental treatment was not related to mean scores. Children who were most uncooperative/fearful on the Frankl had the highest mean scores (Kruskal-Wallis chi2 = 9.48; d.f. = 2; P = 0.009). The internal consistency (Cronbach's alpha) was 0.85, and the test-retest intraclass reliability was 0.74. The authors reported the Greek version of the CFSS-DS to be reliable and valid.

Singh P, Pandey RK, Nagar A and Dutt K in 2009[45] conducted a study to evaluate the reliability and factor structure of the Indian version of the Child fear survey schedule-dental subscale in Indian subjects. 197 subjects, aged 7-12 years old with accompanying parents were included in the study. Children's dental fear was assessed by the parents using a Hindi version of the fifteen item dental subscale of the child fear survey schedule (CFSS-DS) which was filled by parents on behalf of the child. In an attempt to achieve a valid instrument for use, the child fear survey schedule-dental subscale was translated into Hindi by a native speaker and then translated back to English to incorporate in the study. The results showed that the mean total CFSS-DS score was 33.25 (SD 10.03, range 16-53). No significant differences in total fear scores between boys (32.92±10.45) and girls (33.61±9.58) were found. Age-wise scores ranged from 29.86±10.06 (7 years) to 36.89±6.82 (12 years) showing a significant difference (P=0.039), though showing a poor correlation (r=0.052). The internal consistency of the CFSS-DS among Indian children proved to be good; Cronbach's alpha was 0.92. The authors concluded that the Child fear survey scale-dental subscale was found to be reliable and applicable among Indian subjects. The authors reported the universal applicability of children fear survey schedule -dental subscale, while at the same time it was able to highlight different facets of dental anxiety in different environments.

Lee CY, Chang YY and Huang ST in 2007[46] conducted a study to estimate the prevalence of dental anxiety among 5- to 8-year-old children in Kaohsiung City, Taiwan. The Children's Fear Survey Schedule-Dental Subscale (CFSS-DS) was translated into Chinese, and a receiver operating characteristic (ROC) curve was made based on criteria determined from pretest clinical observations of a sample population to set a cutoff score. Then, the parental CFSS-DS was used as a screening tool to survey the dental anxiety levels of 5- to 8-year-old children at kindergartens and elementary schools in Kaohsiung City, Taiwan. Participants were selected by stratified random sampling. The stratification was done by geographic district, age group, and sex. A total of 3,597 valid questionnaires were collected. The Chinese version of the CFSS-DS had an optimal cutoff score of 38/39 (sensitivity was 0.857, specificity was 0.882) with an area under the ROC curve of 0.912. There was high sensitivity and specificity on the parental version using 39 or higher as the cut-off. The estimated prevalence of dental anxiety among 5- to 8-year-old children in Kaohsiung City was 20.6 percent. The dental anxiety score was found to decrease as age increased; primary school boys had significantly lower scores.

Gustafsson A, Arnrup K, Broberg AG, Bodin L and Berggren U in 2010 [47] conducted a methodological study on 438 children aged 8-19 years and their parents to investigate the correlation between individual parental assessments and children's and adolescent's self ratings of dental fear on the Children's fear survey schedule – dental subscale, stratified for referral status, age and gender. The subjects were divided into a Study group consisting of 210 parent and child pairs referred to specialized pediatric dentistry clinics for dental behaviour management problems in combination with a need for dental treatment and a Reference group consisting of 228

parent and child pairs visiting ordinary public dental clinics. Patients and their accompanying parents (mainly mothers) in both groups were asked to fill in the CFSS-DS independently. The results showed that both parental and self ratings on the CFSS-DS were significantly higher in the study group (mean 38.8 and 35.0) compared with the reference group (mean 20.5 and 22.5). In the study group, parental ratings exceeded the self-ratings(mean difference 3.8, SD 12.3) while the reverse was true in the reference group (mean difference -2.1, SD 6.6).patient-parent agreement was modest, particularly among those who were referred because of dental behavior management problems (DBMP). The authors concluded that the validity of parental ratings of their children dental fear should be questioned, particularly in high-fear populations and that self-ratings should, as far as possible, be used to complement parental ratings.

MATERIALS AND METHODS

This clinical study was conducted in the department of Pedodontics and Preventive dentistry, Ragas dental college and hospital, Chennai to compare the effect of Audiovisual Modeling with a video unrelated to dentistry and no video exposure on the fear, anxiety level and behaviour of 135 children between 5 to 9 years of age of both the genders. The study was conducted for a period of 9 months from March 2011 to November 2011.

Approval of this study was obtained from the Ethical Committee, Ragas Dental College.

INCLUSION CRITERIA

1. Children between 5 to 9 years of age.
2. Children who are able to understand the instructions and respond.
3. Children with accompanying parents.
4. Children with no prior dental treatment done.
5. Children who had at least one carious lesion.
6. Children without any obvious intra or extra-oral swellings or systemic illness.
7. Children and parents who are willing to participate in this study and who have given written informed consent.

EXCLUSION CRITERIA

1. Children with mental sub-normality, or physical disabilities and systemic illnesses are excluded.
2. Children not accompanied by parents or whose parents are unable to understand and complete the CFSS-DS.
3. Children for whom parental consent could not be obtained.
4. Children with any intra or extra oral swelling/ acute dental symptoms or previous dental treatment experience.

THE FOLLOWING MATERIALS WERE USED IN THE STUDY:

INSTRUMENTS AND MATERIALS:

- Data recording proforma (ANNEXURE 1)
- Questionnaire containing Children's Fear Survey Schedule - Dental Subscale (Parental version)[48]
- Picture cards related to Venham's Picture Test.[49]
- Mouth mirror and WHO probe[50]
- IOPA radiographic films
- Hand scalers, Ultrasonic scaler unit and scaler tips.
- Rubber dam kit and rubber dam sheets.
- Cotton rolls and Suction tips.
- Cheek retractor, Mouth props.
- Restorative hand instruments: Spoon excavator, Plastic filling instrument, Condenser.

- High speed airotor hand piece, Diamond burs.
- Composite Resin, Etchant & Bonding agent.
- Glass Ionomer Cement.

AUDIOVISUAL AIDS USED FOR BEHAVIOUR MANAGEMENT:

- ❖ Audiovisual modeling video clip of 7 minutes duration depicting a child undergoing dental procedure satisfactorily and being reinforced for cooperative behaviour – used for behaviour management by modeling.
- ❖ Cartoon clip of 7 minutes duration, unrelated to dentistry.
- ❖ DVD player.
- ❖ LCD projector.
- ❖ Speakers.

CONSENT

The parents of the children who participated in this study were clearly explained about the need and purpose of the study in the local language as well as in English. Written consent was obtained from the parents of the children before examining them and conducting the experiment. (ANNEXURE 2, 3)

GROUPS:

The subjects were divided into 3 groups with 45 children in each group.

1. **Group I:** Children viewing film depicting a child undergoing dental treatment and exhibiting positive behaviour which was reinforced prior to the restorative treatment session.

2. **Group II:** Children viewing a cartoon film unrelated to dentistry used as a placebo model prior to the restorative treatment session.
3. **Group III:** No video is viewed prior to the restorative treatment session.

SCALES USED:

Frankl's Rating Scale[51] (ANNEXURE 4)**:** The Frankl scale is probably the most frequently used behaviour rating scale. According to this scale, children can be categorized into one of 4 ratings based on their behaviour in the dental situation: Rating 1 (Definitely negative behaviour), Rating 2 (Negative behaviour), Rating 3 (Positive behaviour) and Rating 4 (Definitely positive behaviour).[51] In this study, behaviour of the subjects during the three treatment sessions was rated by the principal investigator, who carried out the dental treatment in all the subjects. Before participating in the study, the investigator practiced rating children's behaviour under conditions similar to those used in the experiment during a previously conducted pilot study. By this training, an attempt was made to standardize ratings.

Venham's Picture Test[49] (ANNEXURE 5)**:** is a projective self-report measure of anxiety consisting of a series of eight paired drawings of a child, each pair consists of depicting the child in a non-anxious pose and an anxious pose. The respondent is asked to indicate, for each pair, which picture more accurately reflects his or her feelings at the time. Therefore, the scores may range from 0 to 8.[51] Reliability and validity data have been reported.[49]

Children's Fear Survey Schedule – Dental Subscale (Parental Version): [48] (ANNEXURE 6) is a specific dental fear questionnaire for children. The scale consists of 15 items related to various aspects of dental treatment, such as drilling or

injections. Each item can be scored on a Likert 5-point scale from 1 (not afraid at all) to 5 (very afraid). Total scores thus range from minimal 15 to maximal 75. Scores above 38 indicate significant dental fear.[36] In this study, the parents' version of the CFSS-DS was used, hence the questions were aimed at the parent. Research has indicated that parental ratings of child dental fear have a good correlation with other measures.[46,52]

STUDY DESIGN:

Each child was evaluated over two dental visits – (3 sessions)

First visit:

Session 1- Examination and treatment planning

Session 2- Prophylaxis

Second visit:

Audiovisual Modeling/ Cartoon film exposure / No video exposure

Session 3- Restorations.

This study design was similar to that followed by **Melamed BG, Weinstein D, Katin-Borland M and Hawes R.**[10]

METHODOLOGY:

The subjects for this study were selected from the Pediatric and Preventive dentistry outpatient department, Ragas Dental College and Hospital. The children who fulfilled the inclusion criteria and whose parents gave consent for participating in this study were included. Each child along with the accompanying parent was met in the

reception area. The nature of this study and an outline of the procedure were explained to the parents. Written consent was obtained from the parent.

The behaviour of the children was first assessed by the investigator according Frankl's Behaviour rating scale for baseline values. The children were distributed into one of three groups: Group I: (Experimental group) Children undergoing Filmed modelling (n=45), Group II: (Positive Control Group) Children exposed to a film unrelated to dentistry (n=45), or Group III: (Negative Control group) Children not exposed to any film (n=45) according to age, gender and baseline behaviour matching to ensure similar distribution of children in all three groups (matched groups). The Children's Fear Survey Schedule - Dental Subscale was explained to the parent and they were given a pre-formulated questionnaire containing the scale which they filled out in the reception area. For non-English speaking parents, each situation in the 15-item scale was first explained in the local language prior to their rating. Both the child and parent were then escorted into the clinical area.

The child's anxiety rating was obtained by means of the Venham's Picture test during the initial session of the first visit prior to any procedure for baseline records. For this test, each child was shown eight picture cards depicting two young boys displaying anxious or normal behaviour. The child was asked to point out one of the two little boys in each picture who he or she felt most similar to at that moment. The total score represented number of times the child selected the more anxious member of each pair.

After obtaining the baseline behaviour, anxiety and fear ratings, each child selected for the study was examined on the dental chair during the initial session of

the first visit, and the presence of deposits or stains on the teeth and dental caries was recorded. Radiographs were taken if considered necessary and treatment planning was done.

The examination and prophylaxis procedures carried out during the initial as well as second sessions of the first visit were similar for all three groups.

During the second session of the first visit, oral prophylaxis was completed. Basic communicative behaviour management techniques were applied throughout the first visit, during examination as well as oral prophylaxis procedures in all the study subjects. Behaviour rating was repeated by the investigator according to Frankl's scale during the prophylaxis procedure. The child completed the Venham's picture test at the end of Session 2, after prophylaxis.

During the second visit (Session 3), according to the groups ascertained, the children were allowed to view either the modelling film (Group I), cartoon film (Group II) or no film (Group III), after which, restorative treatment was carried out for all the children.

At the end of Session 3, the parent completed the CFSS-DS (parental version) for the second time. The Venham's picture test as well as Frankl's behaviour rating of the child was also repeated in a similar manner as was done in the previous two sessions. Cooperative behaviour during the final session was rewarded with positive reinforcement in the form of praise and a small token gift.

All the data obtained from behaviour, anxiety and fear ratings were tabulated (ANNEXURE 7,8,9) and statistical analysis was done using Friedman's test,

Wilcoxon Signed Ranks test, Kruskal-Wallis test, Oneway Anova, Tukey's HSD Post Hoc test and Student t- test, (SPSS software version 10.5).

Any further dental treatment required for the children, was completed in subsequent visits.

RESULTS

A total of 135 children of both the genders in the age group of 5 to 9 years were selected from the Pediatric and Preventive dentistry outpatient department, Ragas Dental College and Hospital to evaluate the effect of audiovisual modeling on the anxiety, fear and behaviour of pediatric dental patients. These children were age, gender and behaviour matched (based on their baseline behaviour according to Frankl's rating scale) and then distributed into one of three groups: Group I: Children undergoing Filmed modelling (n=45), Group II: Children exposed to a film unrelated to dentistry (n=45), or Group III: Children not exposed to any film (n=45). Each child's behaviour, fear and anxiety ratings in each session were recorded according to Frankl's behaviour rating, Children's fear survey schedule – dental subscale (CFSS-DS) and Venham's picture test respectively and the data for 135 children was subjected to statistical analysis.

Table 1, Graph 1 shows distribution of the study population according to their gender. Of the 135 children included in this study, 71 (52.59%) were males and 64 (47.40%) were females. Group 1 had 22 males (48.89%) and 23 females (51.11%). Group 2 had 25 males (55.56%) and 20 females (44.44%). Group 3 had 24 males (53.33%) and 21 females (46.67%).

There is no significant difference in the distribution of males and females across the three groups. ($P > 0.05$)

Table 2, Graph 2 shows distribution of the study population according to their baseline Frankl's behaviour rating. Out of the 45 children in Group I, 4 children (8.8%) belonged to Frankl's Rating 1 (Definitely Negative) of whom, 2 (4.4%) were boys and the other 2 (4.4%) were girls. 19 children (42.2%) belonged to Frankl's Rating 2 (Negative) of whom, 10 (22.2%) were boys and 9 (20.0%) were girls. 21 children (46.6%) belonged to Frankl's Rating 3 (Positive) of whom, 10 (22.2%) were boys and 11 (24.4%) were girls. One girl (2.2%) belonged to Frankl's Rating 4 (Definitely positive).

In Group II, 4 (8.8%) out of 45 children, belonged to Frankl's Rating 1 (Definitely Negative) of whom, 3 (6.6%) were boys and one (2.2%) was a girl. 20 children (44.4%) belonged to Frankl's Rating 2 (Negative) of whom, 9 (20.0%) were boys and 11 (24.4%) were girls. 20 children (44.4%) belonged to Frankl's Rating 3 (Positive), of whom 12 (26.6%) were boys and 8 (17.7%) were girls. One boy (2.2%) belonged to Frankl's Rating 4 (Definitely positive).

In Group III, 4 (8.8%) out of 45 children, belonged to Frankl's Rating 1 (Definitely Negative) of whom, 2 (4.4%) were boys and the other 2 (4.4%) were girls. 21 children (46.6%) belonged to Frankl's Rating 2 (Negative) of whom 12 (26.6%) were boys and 9 (20.0%) were girls. 19 children (42.2%) belonged to Frankl's Rating 3 (Positive) of whom 9 (20.0%) were boys, and 10 (22.2%) were girls. One boy (2.2%) belonged to Frankl's Rating 4 (Definitely positive).

There is no significant difference in the distribution of males and females and behaviour rating between the three groups ($P > 0.05$).

Table 3A shows the change in the child's behaviour according to Frankl's behaviour rating during the subsequent sessions with exposure to Filmed Modeling.

During Session 1, there were 4 children belonging to the Definitely Negative category (Rating 1). All of them (100%) remained unchanged during the Session 2 but an improvement was noted during Session 3 wherein, 2 children (50.0%) changed to Negative (Rating 2) and 2 children (50.0%) changed to Positive (Rating 3).

Among the 19 children who showed Negative behaviour (Rating 2), during the initial session, 15 of them (78.9%) remained unchanged and 4 (21.1%) showed an improvement to Positive category (Rating 3) during Session 2. In Session 3, 12 children (63.2%) showed an improvement to Positive behaviour (Rating 3) and 5 (26.3%) improved to Definitely positive category (Rating 4), while only 2 (10.5%) of them remained unchanged as Negative (Rating 2).

Out of the 21 children who belonged to the Positive category (Rating 3) during the initial session, 3(14.2%) deteriorated to Negative category (Rating 2), while 17 of them (80.9%) remained unchanged and 1 (4.8%) showed an improvement to Definitely Positive behaviour (Rating 4) during Session 2. 5 children (23.8%) remained as Positive (Rating 3), while 16 children (76.2%) improved to Definitely Positive category (Rating 4) during Session 3.

There was only one child belonging to the Definitely positive category (Rating 4) during Session 1. This child exhibited the same behaviour during the remaining two sessions.

Wilcoxon Signed Ranks Test was used for comparison between the sessions. In Group I, the overall change observed between Session 1 and Session 2 was insignificant ($P > 0.05$), however, a significant improvement was seen on comparing session 1 Vs session 3 ($P \leq 0.01$) as well as session 2 Vs session 3 ($P \leq 0.01$).

Table 3B shows the change in the child's behaviour according to Frankl's behaviour rating during the subsequent sessions with exposure to a cartoon film unrelated to dentistry.

During the initial session, there were 4 children belonging to the Definitely Negative category (Rating 1). None of them showed improvement during Session 2. During Session 3, 3 children (75.0%) remained unchanged, while one (25.0%) showed an improvement to Positive behaviour (Rating 3).

Out of the 20 children belonging to the Negative category (Rating 2) in the initial session, 16 of them (80.0%) remained unchanged and 4 (20.0%) showed an improvement to Positive category (Rating 3) during Session 2. In the Third session, 10 children (50.0%) of them remained as negative (rating 2), while 10 (50.0%) improved to Positive behaviour (Rating 3).

All 20 children belonging to the Positive category (Rating 3) during the initial session, remained unchanged during Session 2. During Session 3, 19 children (95.0%) remained as Positive (Rating 3), while one child (5.0%) improved to Definitely Positive category (Rating 4).

There was only one child belonging to the Definitely positive category (Rating 4) during Session 1. No change was observed in this category during sessions 2 and 3.

Wilcoxon Signed Ranks Test was used for comparison between the sessions. There was a significant change observed between session 1 and session 2 ($P \leq 0.05$) in Group II. A significant change observed between Session 1 and Session 3 ($P \leq 0.005$ – Sig) as well as between session 2 and session 3 ($P \leq 0.005$ – Sig).

Table 3C shows the change in the child's behaviour according to Frankl's behaviour rating during the subsequent sessions with no video exposure.

During Session 1, there were 4 children belonging to the Definitely Negative category (Rating 1). 3 of these children in this category (75.0%) remained unchanged, while one child (25.0%) showed an improved to negative category (Rating 2) during Session 2. No further change was seen in the children in this category during session 3.

Among 21 children belonging to the Negative category (Rating 2) during the initial session, 15 (71.4%) remained unchanged, 5 (23.8%) showed an improvement

to Positive behaviour (Rating 3), while one (4.8%) deteriorated to Definitely Negative behaviour (Rating 1) during Session 2. In Session 3, one child remained as Definitely Negative (Rating 1), 18 (85.7%) showed Negative behaviour (Rating 2), while 2 (9.5%) showed Positive behaviour (Rating 3).

Out of the 19 children belonging to the Positive category (Rating 3) in Session 1, 17 (89.5%) remained unchanged, while 2 children (10.5%) deteriorated to Negative category (Rating 2) during Session 2. In Session 3, 15 children (78.9%) remained as Positive (Rating 3), while 4 children (21.1%) deteriorated to Negative behaviour (Rating 2).

There was only one child in the Definitely positive category (Rating 4) during the initial session, who showed similar behaviour during the remaining two sessions.

Wilcoxon Signed Ranks Test was used for comparison between the sessions. In Group III, the overall change observed between Session 1 and Session 2, Session 2 and Session 3 as well as Session 1 and Session 3 was insignificant ($P > 0.05$).

Table 4, Graph 3 shows the comparison of behaviour between sessions and between the groups based on mean rank assigned to each group during different sessions.

As Frankl's behaviour rating is a categorical variable and not an ordinal variable, comparisons were made according the mean rank obtained based on Frankl's rating assigned to the children in each group in the different sessions.

Wilcoxon Signed Ranks Test was used for Intra group comparison between sessions.

The mean rank of Group I during the first session, was 2.44. This reduced to 2.37 in the second session, but the difference was statistically insignificant. ($P > 0.05$) However during the final session, the mean rank in this group was 1.19, indicating a highly significant improvement in behaviour when compared to the initial session ($P \leq 0.005$) as well as the second session ($P \leq 0.005$).

In Group II, the mean rank reduced from 2.18 during the initial session to 2.04 in the second session. This difference was not statistically significant. ($P > 0.05$) During the third session, the mean rank further reduced to 1.78, which was significantly lower than that noted during the Session 1 ($P \leq 0.005$) as well as Session 2. ($P \leq 0.005$) which this group also showed a significant improvement in behaviour when compared to the previous two sessions.

In Group III, the mean rank reduced slightly from 1.99 in the first session to 1.92 in the second session. This difference was statistically insignificant. ($P > 0.05$) During the final session, the mean rank was 2.09, indicating deterioration in the

behaviour of this group, when compared to the earlier two sessions, however this difference not significant. ($P > 0.05$)

The Kruskal-Wallis test used for comparison between the groups. No statistically significant difference was observed in the behaviour rating between the three groups during Session 1 and Session 2 ($P > 0.05$). However on comparing the behaviour rating during the final session, a significant difference is noted between the three groups ($P \leq 0.005$), indicating that the effect of the intervention in each group significantly differed from one another.

Table 5A shows the assessment of the effect of Filmed Modeling on child's Anxiety level based on Venham's Picture Test.

Among the 45 children in Group I, one child showed an initial score of '1' during Session 1 which remained unchanged during Session 2 and improved to score '0' during session 3.

4 children had an initial score of '2' during Session 1. During Session 2, 1 child (25%) improved to score '1', while 3 children (75%) remained unchanged. During session 3, all 4 children (100%) improved to score '0'.

17 children showed an initial score of '3' during the initial session, out of which, 1 child (5.9%) improved to score '1', 2 children (11.8%) showed an improvement to score '2'. 11 children (64.7%) remained as score '3' (no change)

while 2 children (11.8%) deteriorated to score ‘4’ and 1 child (5.9%) deteriorated to score ‘5’during Session 2. In the third session, 2 children (11.8%) improved to score ‘2’, 9 children (52.9%) improved to score ‘1’ and 6 children (35.3%) improved to score ‘0’.

Among the 5 children with an initial score of ‘4’ during Session 1, 4 (80.0%) remained unchanged as score ‘4’ while 1 child (20.0%) improved to score ‘2’ during Session 2. In the final session, 4 children (80.0%) showed an improvement to score ‘1’ and 1 child (20.0%) improved to score ‘0’.

12 children had an initial score of ‘5’ during Session 1. In Session 2, 7 (58.3%) remained unchanged, while 2 children (16.7%) improved to score ‘4’, 2 (16.7%) showed an improvement to score ‘3 and one child (8.3%) improved to score ‘2’. During session 3, 2 children (16.7%) improved to score ‘4’, 6 (50.0%) improved to score ‘2’ while 4 children (33.3%) improved to score ‘1’.

Out of the 6 children who had an initial score of ‘6’ during Session 1, 4 (66.7%) remained unchanged, while 2 children (33.3%) improved to score ‘5’ during Session 2. In Session 3, 4 children (80.0%) improved to score ‘1’ and 1 child (20.0%) showed an improvement to score ‘0’. During session 3, 2 children (33.3%) improved to score ‘4’, one child (16.7%) improved to score ‘3’, 2 (33.3%) improved to score ‘2’ and one child (16.7%) improved to score ‘1’.

Friedman Test was used for Intra group comparison between sessions. The overall change observed between session 1 and session 2 was insignificant ($P > 0.005$); however, a highly significant improvement was seen on comparing session 1 Vs session 3 ($P \leq 0.01$) as well as session 2 vs. session 3 ($P \leq 0.01$).

Table 5B shows the assessment of the effect of a film unrelated to dentistry on child's Anxiety level based on Venham's Picture Test.

Among the 45 children in Group II, one child showed an initial score of '1' during Session 1 which remained unchanged during Session 2 as well as Session 3.

6 children had an initial score of '2' during Session 1out of whom, 4 (66.7%) remained unchanged, while 2 children (33.3%) improved to score '1' during Session 2. In Session 3, 4 children (66.7%) remained unchanged, one child (16.7%) improved to score '1' and one child (16.7%) showed an improvement to score '0'.

Among the 14 children with an initial score of '3' during Session 1, 10 children (71.4%) showed an improvement to score '3' and 4 children (28.6%) improved to score '2' during the second session. In the third session, 3 children (21.4%) remained unchanged with score '3', 10 (71.4%) showed an improvement to score '2' and 1 child (7.1%) improved to score '1'.

Out of the 7 children with an initial score of '4' in Session 1, 6 children (85.7%) remained unchanged, while 1 child (14.3%) showed an improvement to score

‘3’during the second session. In session 3, 4 children (57.1%) remained unchanged, 2 children (28.6%) improved to score ‘3’, while one child (14.3%) improved to score ‘1’.

13 children showed an initial score of ‘5’ during Session 1. In Session 2, 7 of these children (53.8%) remained unchanged, 2 children (15.4%) improved to score ‘4’, 3 children (23.1%) improved to score ‘3’, while 1 child (7.7%) showed an improvement to score ‘2’. During session 3, 2 children (15.4%) remained unchanged with score ‘5’, 2 children (15.4%) improved to score ‘4’, 7 children (53.8%) improved to score ‘3’ while 2 children (15.3%) improved to score ‘2’.

2 children showed an initial score of ‘6’ during Session 1. During Session 2, both the children (100%) remained unchanged with a score of ‘6’. During Session 3, both the children (100%) showed an improvement to score ‘5’.

2 children showed an initial score of ‘7’ during Session 1. During Session 2, one child (50.0%) remained unchanged with score ‘7’ and the other (50.0%) improved to score ‘6’. During Session 3, one child (50.0%) remained unchanged with score ‘7’ while the other maintained the improvement seen in Session 2 and remained at score of ‘6’.

Friedman Test was used for Intra group comparison between sessions. The overall change observed between session 1 and session 2 was significant ($P \leq 0.05$). A

highly significant improvement was seen on comparing session 1 Vs session 3 ($P \leq 0.01$) as well as session 2 Vs session 3 ($P \leq 0.01$).

Table 5C shows the assessment of the effect of no film exposure on child's Anxiety level based on Venham's Picture Test.

Among the 45 children in Group III, none had a score of '0'.

Two children showed an initial score of '1' during Session 1 which remained unchanged during Session 2. During Session 3, one child (50.0%) remained unchanged with a score of '1', while the other deteriorated to a score of '2'.

Among the 9 children with an initial score of '2' during Session 1, 8 (88.9%) remained unchanged, while one child (11.1%) deteriorated to a score of '3' during the second session. During Session 3, 6 children (66.7%) remained unchanged, 2 (22.2%) deteriorated to score '3', while one child (11.1%) deteriorated to score '5'.

8 children showed an initial score of '3' during Session 1. During session 2, 7 of them (87.5%) remained unchanged, while one child (12.5%) deteriorated to a score of '5'.During the third session, 6 children (75.0%) remained unchanged, one child (12.5%) deteriorated to a score of '5' and one child (12.5%) deteriorated to a score of '6'.

Among the 5 children with an initial score of '4' during Session 1, all 5 (100%) remained unchanged in the second session. During session 3, 4 (80.0%) of them remained unchanged while one child (20.0%) improved to score '3'.

14 children showed an initial score of '5' during Session 1, among whom, 7 children (50.0%) remained unchanged, 5 children (35.7%) improved to score '4', one child (7.1%) improved to score '3', while one child (7.1%) deteriorated to score '6' during Session 2. During Session 3, 9 children (64.3%) remained unchanged, 3 children (21.4%) improved to score '4', one child (7.1%) improved to score '3', while one child (7.1%) deteriorated to score '6'.

Out of the 4 children who showed an initial score of '6' during Session 1, 2 (50.0%) remained unchanged, while 2 (50.0%) improved to score '5'in Session 2. During Session 3, 3 children (75.0%) remained unchanged, while one child (25.0%) improved to score '5'.

Of the 3 children who showed an initial score of '7' during Session 1, one child (33.3%) remained unchanged, one child (33.3%) improved to a score of '6' while one child (33.3%) improved to score '5' in the second session. During Session 3,2 children (66.7%) improved to score '6' and one child (33.3%) improved to score '5'.

Friedman Test was used for Intra group comparison between sessions. No significant change was observed between the sessions in Group III.

Table 6, Graph 4 shows the comparison of the mean anxiety rating between the three study groups across the sessions.

The Friedman Test was used for comparison between sessions. in Group I, the mean anxiety rating during the initial session was 3.91 and reduced to 3.60 in Session 2 and 1.27 during Session 3.This difference was statistically highly significant. ($P \leq 0.01$)

In Group II, the mean anxiety reduced from 3.87 during the initial session to 3.44 during the second session and 1.84 during the final session. This difference was statistically highly significant. ($P \leq 0.01$)

In Group III, there was a slight decrease in the mean anxiety from 3.98 during the initial session to 3.80 during the second session. However, the mean Venham's picture test score increased to 4.00 during the third session, indicating an increase in anxiety. This increase was not statistically significant. ($P > 0.05$)

Kruskal-Wallis Test was used for comparison between groups. There was no statistically significant difference in the mean Venham's Picture Test scores between the three groups during the initial ($P>0.05$) and second ($P>0.05$) sessions. However, in the final session, a highly significant difference was observed in the mean Venham's Picture Test scores between the three groups ($P \leq 0.01$). A greater amount of improvement was seen in Group I, when compared to Group II, and no significant change was noted in case of Group III.

Table 7, Graph 5 shows the change in fear of in all the groups according to mean scores of Children's Fear Survey Schedule – Dental Subscale:

On comparing between sessions, using Paired Student–T Test, there was a highly significant improvement in the mean Children's Fear Survey Schedule – Dental subscale score in Group I from 30.2 ± 6.163 during the initial session to 23.27 ± 4.629 in the final session ($P \leq 0.01$).

Similarly, in Group II, there was a highly significant improvement in the mean Children's Fear Survey Schedule – Dental subscale score from 29.96 ± 5.222 in the initial to 27.18 ± 4.896 during the final session ($P \leq 0.01$).

In group III, an increase from the initial mean Children's Fear Survey Schedule – Dental subscale score of 30.33 ± 6.421 to the final score of 30.64 ± 6.072 indicated a slight increase in fear was noted in this group; however this difference was not statistically significant ($P > 0.05$).

There was no statistically significant difference in the mean Children's Fear Survey Schedule – Dental subscale scores between the three groups during the initial session. ($P > 0.05$). However, in the final session, a statistically significant difference was observed in the mean fear scores between the three groups ($P \leq 0.01$).

A greater amount of improvement was seen in Group I, when compared to Group II, while no significant change was noted in case of Group III.

TABLE 1: DISTRIBUTION OF THE STUDY POPULATION ACCORDING TO GENDER

GROUP	Male (n) (%)	Female (n) (%)	Total (n) (%)
GROUP I	22 48.89%	23 51.11%	45 100%
GROUP II	25 55.56%	20 44.44%	45 100%
GROUP III	24 53.33%	21 46.67%	45 100%
TOTAL	71 52.95%	64 47.40%	135 100%

P-value = 0.812

There is no significant difference in the distribution of males and females across the three groups. ($P > 0.05$)

TABLE 2: DISTRIBUTION OF THE STUDY POPULATION ACCORDING TO BASELINE FRANKL'S BEHAVIOUR RATING

GROUP		Rating 1 (--)	Rating 2 (-)	Rating 3 (+)	Rating 4 (++)	Total
GROUP I	Male	2 (4.4%)	10 (22.2%)	10 (22.2%)	0 (0%)	22 (48.89%)
	Female	2 (4.4%)	9 (20.0%)	11 (24.4%)	1 (2.2%)	23 (51.11%)
	Total	4 (8.8%)	19 (42.2%)	21 (46.6%)	1 (2.2%)	45 (100%)
GROUP II	Male	3 (6.6%)	9 (20.0%)	12 (26.6%)	1 (2.2%)	25 (55.56%)
	Female	1 (2.2%)	11 (24.4%)	8 (17.7%)	0 (0%)	20 (44.44%)
	Total	4 (8.8%)	20 (44.4%)	20 (44.4%)	1 (2.2%)	45 (100%)
GROUP III	Male	2 (4.4%)	12 (26.6%)	9 (20.0%)	1 (2.2%)	24 (53.33%)
	Female	2 (4.4%)	9 (20.0%)	10 (22.2%)	0 (0%)	21 (46.67%)
	Total	4 (8.8%)	21 (46.6%)	19 (42.2%)	1 (2.2%)	45 (100%)

Group I: p-value = 0.782

Group II: p-value = 0.480

Group III: p-value = 0.732

There is no significant difference in the distribution of males and females and behaviour rating between the three groups ($P > 0.05$).

TABLE 3A: CHANGE IN THE CHILD'S BEHAVIOUR WITH AUDIOVISUAL MODELING

Rating	Session 1	Session 2				Session 3			
		Rating 1	Rating 2	Rating 3	Rating 4	Rating 1	Rating 2	Rating 3	Rating 4
Rating 1									
Number	4	4	-	-	-	-	2	2	-
Percentage	(100)	(100)	-	-	-	-	(50.0)	(50.0)	-
Rating 2									
Number	19	-	15	4	-	-	2	12	5
Percentage	(100)	-	(78.9)	(21.1)	-	-	(10.5)	(63.2)	(26.3)
Rating 3									
Number	21	-	3	17	1	-	-	5	16
Percentage	(100)	-	(14.2)	(80.9)	(4.8)	-	-	(23.8)	(76.2)
Rating 4									
Number	1	-	-	-	1	-	-	-	1
Percentage	(100)	-	-	-	(100)	-	-	-	(100)

Group 1 - Frankl : Session 1 Vs Session 2: P value 0.257

Group 1 - Frankl : Session 2 Vs Session 3: P value 0.000 **

Group 1 - Frankl : Session 1 Vs Session 3: P value 0.000 **

The overall change observed between Session 1 and Session 2 was insignificant ($P > 0.05$), however, a significant improvement was seen on comparing session 1 Vs session 3 ($P \leq 0.01$) as well as session 2 Vs session 3 ($P \leq 0.01$).

TABLE 3B: CHANGE IN THE CHILD'S BEHAVIOUR WITH EXPOSURE TO A FILM UNRELATED TO DENTISTRY

Rating	Session 1	Session 2				Session 3			
		Rating 1	Rating 2	Rating 3	Rating 4	Rating 1	Rating 2	Rating 3	Rating 4
Rating 1									
Number	4	4	-	-	-	3	1	-	-
Percentage	(100)	(100)	-	-	-	(75.0)	(25.0)	-	-
Rating 2									
Number	20	-	16	4	-	-	10	10	-
Percentage	(100)	-	(80.0)	(20.0)	-	-	(50.0)	(50.0)	-
Rating 3									
Number	20	-	-	20	-	-	-	19	1
Percentage	(100)	-	-	(100)	-	-	-	(95.0)	(5.0)
Rating 4									
Number	1	-	-	-	1	-	-	-	1
Percentage	(100)	-	-	-	(100)	-	-	-	(100)

Group II - Frankl : Session 1 Vs Session 2: P value - 0.046 *

Group II - Frankl : Session 2 Vs Session 3: P value - 0.000 **

Group II - Frankl : Session 1 Vs Session 3: P value - 0.000 **

A significant change observed between Session 1 and Session 3 ($P \leq 0.005$) as well as between session 2 and session 3 ($P \leq 0.005$).

TABLE 3C: CHANGE IN THE CHILD'S BEHAVIOUR IN THE NON-INTERVENED GROUP

Rating	Session 1	Session 2				Session 3			
		Rating 1	**Rating 2**	**Rating 3**	**Rating 4**	**Rating 1**	**Rating 2**	**Rating 3**	**Rating 4**
Rating 1									
Number	4	3	1	0	0	3	1	0	0
Percentage	(100)	(75.0)	(25.0)	(.0)	(.0)	(75.0)	(25.0)	(.0)	(.0)
Rating 2									
Number	21	1	15	5	0	1	18	2	0
Percentage	(100)	(4.8)	(71.4)	(23.8)	(.0)	(4.8)	(85.7)	(9.5)	(.0)
Rating 3									
Number	19	0	2	17	0	0	4	15	0
Percentage	(100)	(.0)	(10.5)	(89.5)	(.0)	(.0)	(21.1)	(78.9)	(.0)
Rating 4									
Number	1	0	0	0	1	0	0	0	1
Percentage	(100)	(.0)	(.0)	(.0)	(100)	(.0)	(.0)	(.0)	(100)

Group III - Frankl : Session 1 Vs Session 2: P value - 0.480

Group III - Frankl : Session 2 Vs Session 3: P value - 0.059

Group III - Frankl : Session 1 Vs Session 3: P value - 0.257

The overall change observed between Session 1 and Session 2, Session 2 and Session 3 as well as Session 1 and Session 3 was insignificant ($P > 0.05$).

TABLE 4: COMPARISON OF THE CHILD'S BEHAVIOUR ACCORDING TO THE MEAN RANK OF FRANKL'S BEHAVIOUR RATING BETWEEN THE STUDY GROUPS DURING THE EXPERIMENTAL PERIOD

Rating	Session 1	Session 2	Session 3
GROUP I	2.44	2.37	1.19
GROUP II	2.18	2.04	1.78
GROUP III	1.99	1.92	2.09
P value (Inter group comparisons)	**0.938**	**0.892**	**0.000****

Comparing between sessions (Intra group comparison):

Rating	Session 1 Vs Session 2	Session 2 Vs Session 3	Session 3 Vs Session 1
Group I	0.257	0.000 **	0.000 **
Group II	0.046 *	0.000 **	0.000 **
Group III	0.480	0.059	0.257

On comparing the behaviour rating during the final session, a significant difference is noted between the three groups ($P \leq 0.005$), indicating that the effect of the intervention in each group significantly differed from one another.

TABLE 5A: EFFECT OF FILMED MODELING ON CHILD'S ANXIETY LEVEL

Score	Session 1		Session 2										Session 3								
			0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
0	-		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
1	1		-	1	-	-	-	-	-	-	-		1	-	-	-	-	-	-	-	-
2	4		-	1	3	-	-	-	-	-	-		4	-	-	-	-	-	-	-	-
3	17		-	1	2	11	2	1		-	-		6	9	2	-	-	-	-	-	-
4	5		-	-	1	-	4	-	-	-	-		1	4	-	-	-	-	-	-	-
5	12		-	-	1	2	2	7	-	-	-		-	4	6	-	2	-	-	-	-
6	6		-	-	-	-	-	2	4	-	-		-	1	2	1	2	-	-	-	-
7	-		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
8	-		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-

Group 1 - Venham : Session 1 Vs Session 2: P – Value 0.026

Group 1 - Venham : Session 2 Vs Session 3: P value 0.000*

Group 1 - Venham: Session 1 Vs Session 3: P value 0.000*

The overall change observed between session 1 and session 2 was insignificant ($P > 0.005$); however, a highly significant improvement was seen on comparing session 1 Vs session 3 ($P \leq 0.01$) as well as session 2 Vs session 3 ($P \leq 0.01$).

TABLE 5B: EFFECT OF A FILM UNRELATED TO DENTISTRY ON CHILD'S ANXIETY LEVEL

Score	S1		S2										S3								
			0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
0	-		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
1	1		-	1	-	-	-	-	-	-	-		-	1	-	-	-	-	-	-	-
2	6		-	2	4	-	-	-	-	-	-		1	1	4	-	-	-	-	-	-
3	14		-	-	4	10	-	-	-	-	-		-	1	10	3	-	-	-	-	-
4	7		-	-	-	1	6	-	-	-	-		-	1	-	2	4	-	-	-	-
5	13		-	-	1	3	2	7	-	-	-		-	-	2	7	2	2	-	-	-
6	2		-	-	-	-	-	-	2	-	-		-	-	-	-	-	-	2	-	-
7	2		-	-	-	-	-	-	1	1	-		-	-	-	-	-	-	1	1	-
8			-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-

Group II - Venham : Session 1 Vs Session 2: P – Value P – Value 0.001 *

Group II - Venham : Session 2 Vs Session 3: P value 0.000 **

Group II - Venham: Session 1 Vs Session 3: P value 0.000 **

The overall change observed between session 1 and session 2 was significant ($P \leq 0.05$). A highly significant improvement was seen on comparing session 1 Vs session 3 ($P \leq 0.01$) as well as session 2 Vs session 3 ($P \leq 0.01$).

TABLE 5C: EFFECT OF NO INTERVENTION ON CHILD'S ANXIETY LEVEL

Score	S1		S2										S3								
			0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
0			-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
1	2		-	2	-	-	-	-	-	-	-		-	1	1	-	-	-	-	-	-
2	9		-	-	8	1	-	-	-	-	-		-	-	6	2	-	1	-	-	-
3	8		-	-	-	7	-	1	-	-	-		-	-	-	6	-	1	1	-	-
4	5		-	-	-	-	5	-	-	-	-		-	-	-	1	4	-	-	-	-
5	14		-	-	-	1	5	7	1	-	-		-	-	-	1	3	9	1	-	-
6	4		-	-	-	-	-	2	2	-	-		-	-	-	-	-	1	3	-	-
7	3		-	-	-	-	-	1	1	1	-		-	-	-	-	-	1	2	-	-
8			-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-

Group III - Venham : Session 1 Vs Session 2: P – Value 0.097

Group III - Venham : Session 2 Vs Session 3: P value 0.168

Group III - Venham: Session 1 Vs Session 3: P value 1.000

No significant change was observed between the sessions in Group III.

TABLE 6: COMPARISON OF THE MEAN ANXIETY RATING BETWEEN THE STUDY GROUPS DURING THE EXPERIMENTAL PERIOD

GROUP	**SESSION 1** **Mean ± SD**	**SESSION 2** **Mean ± SD**	**SESSION 3** **Mean ± SD**	**Intra Group comparison** **(p value)**
Group I	3.91 ± 1.3284	3.60 ± 1.4045	1.27 ± 1.1560	**0.000****
Group II	3.87 ± 1.3915	3.44 ± 1.4390	1.84 ± 1.4135	**0.000****
Group III	3.98 ± 1.6444	3.80 ± 1.4554	4.00 ± 1.4142	**1.000**
Inter Group comparison **(p value)**	**0.936**	**0.500**	**0.000****	

A significant difference was observed between the mean Venham Picture Test scores of the three groups during the final session ($P \leq 0.01$). A greater amount of improvement was seen in Group I, when compared to Group II, and no significant change was noted in case of Group III.

TABLE 7: COMPARISON OF THE MEAN FEAR SCORES (CFSS-DS) BETWEEN THE STUDY GROUPS DURING THE EXPERIMENTAL PERIOD

GROUP	PRE INTERVENTION Mean ± SD	POST INTERVENTION Mean ± SD	Pre Vs Post Comparison (p value)
Group I	30.2 ± 6.163	23.27 ± 4.629	**0.000****
Group II	29.96 ± 5.222	27.18 ± 4.896	**0.000****
Group III	30.33 ± 6.421	30.64 ± 6.072	**0.486**
P value	**0.989**	**0.000****	

A significant difference was observed between the mean fear scores of the three groups seen after the intervention ($P \leq 0.01$). A greater amount of improvement was seen in Group I, when compared to Group II, while no significant change was noted in case of Group III.

DISCUSSION

Dental fear and anxiety in patients still poses a significant problem for the practice of dentistry. Alleviating a child's anxiety about dental treatment is important not only in mitigating the immediate fear but also in preventing apprehension continuing into adulthood[54] A child's anxiety and fear have an influence on the behaviour in the dental operatory.

Although it is important to develop new techniques for reducing fear and anxiety and improving behaviour, it may also be fruitful to promote those promising techniques that already possess an initial research base, but have not received enough support or attention to be incorporated into daily dental practice. One such behaviour management technique is Modeling.[55] Modeling is of two types, Live or participant modeling and Audiovisual modeling.[56,57] With Live Modeling, there is the practical difficulty that an appropriate model may not always be available as and when required. This may be overcome by Audiovisual or Filmed modelling. One drawback of this technique however, is the economic and logistical difficulties of making one's own video and accessing playback equipment.[55]

The success of Modeling in reducing dental fear and anxiety is well documented in the past; despite which it has not been widely practiced as a routine behavior management technique.[17] In addition, most of the research on this subject dates back to two or three decades ago[20-22,34-38], and there is little published literature on the effectiveness of this technique from recent times. Hence, the present study was undertaken to determine the efficacy of Audiovisual (filmed) modeling in reducing

dental fear and anxiety and improving cooperation in present day pediatric dental patients.

135 children between 5 to 9 years of age, with no previous dental treatment done were included in this study. This age group was chosen as it has been stated that the application of the social learning theory is effective with children ranging from 4-9 years and only potentially effective for children younger than 4 years of age[58]. Children who had not undergone any previous dental treatment were chosen because previous experience can have a decided effect on one's attitude toward dentistry[59,60]. Since this study dealt with sequential dental visits which also included restorative dental treatment, only children with atleast one carious lesion were chosen for this study. The children were age, gender and behaviour matched to ensure standardization and distributed into one of three groups, Group I: Children undergoing Filmed modelling, Group II: Children exposed to a film unrelated to dentistry, or Group III: Children not exposed to any film. Each child underwent three treatment sessions during which examination and treatment planning, oral prophylaxis and restorations respectively were carried out. This study design was based on that followed by **Melamed BG et al**[10]**.**

The child's response during each session was assessed using three measures: Frankl's rating scale[51] for assessment of behaviour, Venham's Picture Test[49] for assessment of anxiety, and parental version of the Children's Fear Survey Schedule–Dental Subscale for assessment of dental fear[48.] These scales have been accepted and proven as reliable and valid measures of the child's response in the dental situation and have been widely employed in previous studies[52,53].

According to the present study's results, it was found that among the children in Group I (Tables 3A, 5A, 7),a definite reduction in anxiety ($P \leq 0.005$) and fear ($P \leq 0.005$) and an improvement in behaviour ($P \leq 0.005$) was seen after exposure to Filmed modelling, when compared with both the initial sessions prior to the video exposure. The improvement in behavior in this group maybe due to the observation of a filmed model who depicted positive behaviour during dental treatment and was in turn, verbally and materially reinforced for cooperation in the Modeling film. Exposure to the Modeling film may have familiarized the children to the sights, sounds and procedures that they will be subjected to. Hence the threat of the unknown was reduced or eliminated among these children which may have reduced their anxiety and negative responses towards an unfamiliar situation by fear extinction.

These results are in accordance with those found by **Fields and Pinkham**[35]**, Johnson and Machen**[21] **and Melamed, B. G et al**[10] who reported reduced fear and improved behaviour among children during treatment visits after Modeling, but contrary to the findings of **Conyers et al**[39] who reported that Modeling was less effective than desensitization in increasing compliance during dental treatment in patients with severe to profound mental retardation.

Among the children in Group II (Tables 3B, 5B, 7), a considerable reduction of anxiety and fear and an improvement in behaviour was seen after viewing the cartoon clip, when compared with both the sessions prior to the video exposure ($P \leq 0.005$).This may be explained by the fact that viewing the cartoon clip may have promoted some degree of relaxation of the child in the dental environment.

These results are contrary to those reported by **Melamed, B. G et al**[10] who found that the frequency of disruptive behaviour increased (256%) in children who viewed a film unrelated to dentistry prior to their restorative procedure. **Rouleau et al**[41] reported more negative verbalizations and agitated behaviour in children viewing an unrelated film than those exposed to filmed modelling.

In Group III however (Tables 3C, 5C, 7), there was a slight increase in the anxiety and fear of the children and deterioration in their behaviour during the final session compared to initial two sessions, but this change was not to a significant level ($P > 0.05$).This may have occurred because these children did not receive any pre-exposure or relaxation mechanism to reduce their anxiety prior to undergoing an unfamiliar procedure (restorations) unlike the previous two groups. These results are in accordance with those found by **Fields and Pinkham**[35] and **Machen and Johnson**[21].

When the effect of exposure to the modelling film, unrelated cartoon film and no video exposure in reducing anxiety, fear extinction and improving behaviour among the children were compared, the present study's results showed that the Modeling group showed the most significant improvement in anxiety, fear and behaviour ($P \leq 0.01$). The group exposed to the unrelated cartoon film also showed significant improvement ($P \leq 0.01$), however, this effect was less than that seen in the Modeling group. This may be because the exposure to the cartoon clip resulted in some amount of relaxation of the children before their restorative procedure. However, it had no dental relevance and did not provide the child any pre-exposure to the procedures that were to be carried out or the appropriate response to them. On the

contrary, the children who were not exposed to any video, showed a slight increase in anxiety and fear, as well as deterioration in behaviour ($P > 0.05$). This may have occurred because these children did not receive any pre-exposure or relaxation mechanism to reduce their anxiety unlike the previous two groups. These results were similar to those reported by **Melamed, B. G et al** [10] who observed that children who viewed a modelling film showed significantly lesser negative behaviour during restorative care and were rated as less fearful than the control group who watched a control film unrelated to dentistry. **Farhat-McHayleh, Harfouche and Philippe Souaid**[40] also reported lower anxiety and fear in children who received live modelling, when compared with those who were prepared by the tell–show–do method ($P < 0.01$).

An incidental finding during this study, was that the changes in the behaviour, anxiety and fear within each group appeared to occur in a related manner. Although this relation was not analysed, further exploration of this observation may help explain the inter-relationship and influence if any, of these factors on each other.

The amount of change in the behaviour, anxiety and fear differed between sessions and between groups (Tables 3A, 3B, 3C, 5A, 5B, 5C). Further, variations in response were also observed from individual to individual within a particular group. However, when the overall groups were considered, a definite improvement was noted in the children in the filmed modelling group, followed by those in the cartoon film group, with no improvement in the group without any video exposure. These variations in response require further exploration to shed light on the factors influencing the amount of change brought about in anxiety, fear and behaviour.

Modeling may not be universally applicable to all children. The effect of this method varies from individual to individual, and the baseline behaviour also influences the extent of improvement that is possible. In this study, no uniform improvement was noted among all the children undergoing modelling (Tables 3A, 5A). These variations in the effect need to be explored in future studies. In addition, in this study, the evaluation of Modeling as a behaviour management technique was limited to restorative procedures. Hence, a future study which includes invasive techniques involving local anaesthetic injections is required to assess the effect of this technique in more fear provoking situations. Further, the effect of Modeling is best retained when the procedure is repeated rather than limited to a single exposure. This can be explored by repeating the modelling procedures over multiple treatment sessions.

A child's initial exposure to a dentist is a pivotal moment in the reduction or expansion of dental fear and anxiety. With the high prevalence of dental anxiety in children and the public health problem it poses, a preventative approach could benefit both child and the field of dentistry. The technique of Modeling offers not only a preventative approach but also easy and effective interventions that can be used with children, in particular ranging from 5-9years of age. A dentist can act on his own free will to reduce disruptions in his office by incorporating either films or live observations within his or her practice. The collaboration between psychology and dentistry offers both fields a better understanding of dental fear and anxiety and further improves the resources available to those children that suffer from them.[57]

CONCLUSION

Within the limitations of this study, it can be concluded that:

1. Among the children in the Modeling group, the overall change in behaviour observed between session 1 (mean rank: 2.44) and session 2 (mean rank: 2.37) was insignificant ($P > 0.05$). However, a significant improvement ($P \leq 0.01$) in behaviour was noted after Modeling (mean rank: 1.19).
2. Similarly, among the children in the Cartoon film group, the overall change in behaviour observed between session 1 (mean rank: 2.18) and session 2 (mean rank: 2.04) was insignificant ($P > 0.05$). However, a significant improvement ($P \leq 0.01$) in behaviour was noted after viewing the film (mean rank: 1.78).
3. On the contrary, a deterioration in the behaviour of the children with no film exposure was noted in the final session (mean rank: 2.09) when compared to session 1 (mean rank: 1.99) and session 2 (mean rank: 1.92), although this change was not significant.
4. There is a significant reduction in the mean anxiety level of Group I after Modeling (1.27 ± 1.1560) compared to the initial session (3.91 ± 1.3284) and second session (3.60 ± 1.4045) prior to video exposure. ($P \leq 0.01$)
5. Similarly, a significant reduction in the mean anxiety level of Group II after Cartoon film exposure (1.84 ± 1.4135) when compared to the initial session (3.87 ± 1.3915) and second session (3.44 ± 1.4390) prior to exposure ($P \leq 0.01$).
6. In the no video group, a slight increase in the mean anxiety was observed during the final session (4.00 ± 1.4142) when compared to the first session

(3.98 ± 1.6444) and second session (3.80 ± 1.4554) although this difference was not statistically significant.

7. There was a significant reduction in the mean fear score of Group I from 30.2 ± 6.163 during the initial session to 23.27 ± 4.629 after Filmed Modeling ($P \leq 0.01$).
8. In Group II, there was a significant reduction in the mean fear score from 29.96 ± 5.222 in the initial and 27.18 ± 4.896 after exposure to the cartoon film. ($P \leq 0.01$).
9. However in the children who did not undergo any video exposure, there was a marginal increase in mean fear score from 30.33 ± 6.421 to the final score of 30.64 ± 6.072 ($P > 0.05$).
10. There was no significant difference in the behaviour, anxiety or fear of the three groups during Session 1 and Session 2 ($P > 0.05$). However during the final session, a significant improvement was noted in Group I and Group II. ($P \leq 0.005$). The amount of improvement noted was greater in Group I than in Group II. Conversely, in Group III, there was no improvement in the behaviour during the final session.

The study results establish significantly lower anxiety, fear and negative behaviour in the Modeling group compared with the cartoon film group and no video exposure group. Some improvement in behaviour and reduction of fear and anxiety was also noted in the children who viewed the cartoon film, although to a lesser extent as compared to the Modeling group. Based on these conclusions, it is suggested that Audiovisual modelling as well as creating a relaxed atmosphere by use of cartoon

videos prior to treatment may be employed as effective routine behaviour management techniques in paediatric dental patients aged 5-9 years.

The factors influencing the extent of the effect of Modeling should be explored in future studies.

SUMMARY

The present study was done to assess the effect of Audiovisual Modeling on children's fear, anxiety level & behaviour and to compare the effect of exposure to Audiovisual Modeling with a film which is unrelated to dentistry and Control group (no video) on the fear, anxiety levels and behaviour of children aged 5 to 9 years.135 children belonging to this age group were divided into one of three groups, which were exposed to Audiovisual Modeling, exposure to a film unrelated to dentistry, and no intervention respectively. Each child underwent three treatment sessions during which examination and treatment planning, oral prophylaxis and restorations respectively were carried out. Anxiety and behaviour ratings were recorded during each of the three sessions, while fear rating was recorded during the first and third sessions only.

It was found that among the children who underwent Audiovisual Modeling, a definite reduction in anxiety ($P \leq 0.005$) and fear ($P \leq 0.005$) and an improvement in behaviour ($P \leq 0.005$) was seen after exposure to Filmed modelling, when compared with both the initial sessions prior to the video exposure.

Among the children who were exposed to the unrelated film, a considerable reduction of anxiety and fear and an improvement in behaviour was seen after viewing the cartoon clip, when compared with both the sessions prior to the video exposure ($P \leq 0.005$). However this improvement was less than that observed in the Modeling group.

In the children with no intervention, there was a slight increase in the anxiety and fear of the children and deterioration in their behaviour during the final session compared to initial two sessions, but this change was not to a significant level ($P > 0.05$).

The results of this study show that Audiovisual Modeling as well as use of cartoon videos to create a relaxed atmosphere prior to treatment may be employed as effective routine behaviour management techniques in paediatric dental patients aged 5-9 years. Audiovisual Modeling is more effective at reducing fear, anxiety and negative behaviour than exposure to an unrelated cartoon film.

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ANNEXURE-1

DATA RECORDING PROFORMA

Case Sheet number: **Date:** 1.
O.P. number 2.
3.
4.

Name: **Age/Gender:**

Group I/ Group II/ Group III:

Informer:

Address: **Phone Number:**

Chief Complaint:

History of presenting illness:

Diagnosis:

Treatment Plan:

Behavior Rating: Frankl's rating scale

1.
2.
3.

Anxiety Rating: (Venham's picture test)

1.
2.
3.

Fear Rating: Child Fear Survey Schedule – Dental subscale

1.

2.

Treatment done:

1.

2.

3.

4.

ANNEXURE – 2

CONSENT FORM

I, …… parent of ……., aged ….. years, Hindu/ Christian/ Muslim …… residing at …… …… do hereby solemnly state as follows:

I am aware of the facts stated here under:

I state that I brought my child to Ragas Dental College and Hospital, Chennai for his/her treatment for tooth decay.

My child was examined by Dr Madhulika Injeti, and I have been informed that my child is required to undergo the following procedures/investigations:

1. Oral prophylaxis
2. Restorative treatment
3. Radiographs (if required)

I was also informed about the pros and cons of my son's/ daughter's treatment in …….. (language) known to me.

I give my consent for my son's/daughter's treatment and for his/her participation in the study after knowing the full consequences of the dissertation/ thesis/ study. I am willing to fill the questionnaire form required for the study and I undertake to cooperate with the doctor for the study.

I also assure that I shall bring my child for each and every sitting without fail.

I also authorize the doctor to proceed with further treatment or any other/suitable/alternative method for the study.

I have given consent for my child to undergo the treatment without any individual pressure or duress.

I am also aware that I am free to withdraw the consent given at any time during the study in writing.

Signature of the Parent

The parent was explained the procedure to be carried out for the child by me and he/she has understood the same and with full consent signed in (English/Tamil/Hindi/Telugu) ……. before me.

Signature of the Doctor

ANNEXURE - 3

ஒப்புதல் படிவம்

…… ஆகிய நான் …….. என்கின்ற குழந்தையின் வயது …….. என்பதனையும். நாங்கள் இந்து/கிருஸ்தவ/முஸ்லிம் …… விலாசத்தில் வசிக்கின்றோம் என்று உறுதியளிக்கின்றேன்.

மேலும் நான் கீழே குறிப்பிடப்பட்டுள்ள சிகிச்சைக்கான விபரங்களை அறிவேன் நான் எனது குழந்தையின் பல் சொத்தைச்சிகிச்சைக்காக ராகாஸ் பல் மருத்துவமனைக்கு அழைத்து வந்துள்ளேன்.

எனது குழந்தை **Dr. ……** என்பவரால் பரிசோதிக்கப்பட்டு கீழ்கண்ட சிகிச்சைகளும்/மருத்துவப் பரிசோதனைகளும் தேவைப்படும் என எனக்கு கூறப்பட்டுள்ளது.

1. பற்களை சுத்தம் செய்தல்
2. பற்சொத்தை அடைத்தல்
3. ஊடுகதிர் படங்கள் (தேவையிருப்பின்)

இந்த சிகிச்சை முறையினால் எனது மகனுக்கு/மகளுக்கு ஏற்படக்கூடிய நன்மை தீமைகளைப் பற்றி நான் அறிந்த மொழியில் சொல்லப்பட்டுள்ளது.

எனது மகன்/மகள் இந்த ஆராய்ச்சிப்படிப்பில் பங்கு பெறுவதற்கு நான் எனது முழுமனதுடன் சம்மதம் அளிக்கின்றேன். மேலும் ஆராய்ச்சிக்கு தேலையான வினாப்பட்டியல் பூர்த்தி செய்யவும், மருத்துவரின் ஆராய்ச்சிப் படிப்புக் காலத்தில் போதும் எனது முழு ஒத்துழைப்பும் தருவேன் என உறுதியளிக்கின்றேன்.

மருத்துவரின் வழிகாட்டுதலின்படி ஆராய்ச்சிக்குத் தேவையான சரியான அல்லது மாற்று வழி சிகிச்சைமுறைக்கும் நான் சம்மதம் அளிக்கின்றேன்.

நான் எனது குழைந்தைக்கு தேவையான சிகிச்சை அளிக்க எந்த வித அச்சமுமின்றி, தன்னிச்சையாகவும் முழுமனதுடன் சம்மதம் அளிக்கின்றேன்.

மேலும் நான் இந்த ஆராய்ச்சிப்படிப்பிற்க்கான கொடுத்துள்ள ஒப்புதலை எப்பொழுது வேண்டுமானாலும் எழுத்தின் முலமாக விலகிக்கொள்ளலாம் என்பதை அறிவேன்.

பெற்றோர் கையெப்பம்

இந்தக் குழந்தைக்கு தேவைப்படும் சிகிச்சை முறையினைப்பற்றி அவரது பெற்றோருக்கு (ஆங்கிலம்/தமிழ்/ஹந்தி/தெலுங்கு) ..... மொழியல் விளக்கிக் கூறப்பட்டது. அதனைப்புரிந்து கொண்ட பிறகு அவர் எனது முன்னிலையில் முழுசம்மதத்துடன் ஒப்புதல் படிவத்தில் கையெப்பமிட்டர்.

மருத்துவரின் கையெப்பம்

ANNEXURE – 4

FRANKL'S RATING SCALE

Rating No. 1: Definitely Negative

1. Refuses treatment
    a. Immature behaviour: cannot reason or cope with situations
        i. Toddler or early pre-schooler
        ii. The special child
    b. Uncontrollable behaviour: essentially a temper tantrum, suggestive of extreme anxiety

        Pre-schooler
    c. Defiant behaviour: active or passive type resistance; the "spoiled child"; stubbornness is also associated with this type of response.

        Middle years child
2. Cries forcibly
    a. Uncontrollable behaviour
        i. Late pre-schooler or early middle years child
3. Is extremely negative, associated with fear
    a. Uncontrollable behaviour may be exhibited for example by the older young person possessing deep seated emotional problems.
    b. Defiant behaviour: includes passive resistance in individual approaching adolescence.

Rating No. 2: Negative

1. Is reluctant to accept treatment
    a. Immature behaviour
        i. Toddler or early pre-schooler: too young in years
        ii. The special child
    b. Timid behaviour: seen in the child who is over protected, exposed to few people, or daunted by strange environments; this type of child may revert to uncooperative behaviour if mismanaged

c. Influenced behaviour: includes family and peer pressure

2. Displays evidence of slight negativism
    a. Timid behaviour: must be taught confidence in himself or herself and the dentist
    b. Whining behaviour

        Pre-school and middle years child

Rating No. 3: Positive

1. Accepts treatment
    i. Tense cooperative behaviour: observed in all stages; follows the dentist's directions but may be hesitant and cautious
    ii. Concertive behaviour: responds harmoniously
    iii. Whining behaviour: may or may not be considered negative behaviour
    iv. Timid behaviour: follows the dentist's directions in a shy, quiet manner.

Rating No. 4: Definitely Positive

1. Unique behaviour: looks forward to and understands the importance of good preventive care.

ANNEXURE – 5

VENHAM'S PICTURE TEST

The Venham’s picture test is a projective self-report measure of anxiety consisting of eight items. The child was asked to choose the little boy in each picture who feels the most like he feels. The child's score represented the number of times the more anxious member of each pair was chosen. Therefore, the scores may range from 0 to 8.

ANNEXURE - 6

CHILDREN'S FEAR SURVEY SCHEDULE – DENTAL SUBSCALE (CFSS-DS) : PARENTAL VERSION

1.	Dentists	**1**	**2**	**3**	**4**	**5**
2.	Doctors	**1**	**2**	**3**	**4**	**5**
3.	Injections	**1**	**2**	**3**	**4**	**5**
4.	Having somebody examine the mouth	**1**	**2**	**3**	**4**	**5**
5.	Having to open your mouth	**1**	**2**	**3**	**4**	**5**
6.	Having a stranger touch you	**1**	**2**	**3**	**4**	**5**
7.	Having somebody look at you	**1**	**2**	**3**	**4**	**5**
8.	The dentist drilling	**1**	**2**	**3**	**4**	**5**
9.	The sight of the dentist drilling	**1**	**2**	**3**	**4**	**5**
10.	The noise of the dentist drilling	**1**	**2**	**3**	**4**	**5**
11.	Having someone put instruments in your mouth	**1**	**2**	**3**	**4**	**5**
12.	Choking	**1**	**2**	**3**	**4**	**5**
13.	Having to go to the hospital	**1**	**2**	**3**	**4**	**5**
14.	People in white uniforms	**1**	**2**	**3**	**4**	**5**
15.	Having the nurse clean your teeth	**1**	**2**	**3**	**4**	**5**

The anxiety is marked in 5 point anxiety scale:

1. Not afraid at all
2. Very little
3. Moderate fear
4. Pretty much afraid
5. Very much afraid

ANNEXURE-7

MASTER CHART: GROUP –I

S.No	RATING SCALE	SESSION 1	SESSION 2	SESSION 3
1	*Frankl* *Venham* *CFSS-DS*	(--) 6 42	(--) 6 -	(-) 4 35
2	*Frankl* *Venham* *CFSS-DS*	(--) 5 39	(--) 5 -	(+) 2 33
3	*Frankl* *Venham* *CFSS-DS*	(--) 6 44	(--) 6 -	(-) 4 32
4	*Frankl* *Venham* *CFSS-DS*	(--) 6 42	(--) 6 -	(+) 3 28
5	*Frankl* *Venham* *CFSS-DS*	(-) 5 36	(-) 5 -	(+) 2 28
6	*Frankl* *Venham* *CFSS-DS*	(-) 4 35	(-) 4 -	(+) 1 28
7	*Frankl* *Venham* *CFSS-DS*	(-) 4 39	(+) 2 -	(++) 0 20
8	*Frankl* *Venham* *CFSS-DS*	(-) 5 36	(-) 4 -	(+) 2 26
9	*Frankl* *Venham* *CFSS-DS*	(-) 5 31	(-) 4 -	(+) 2 23

10	*Frankl* *Venham* *CFSS-DS*	(-) 4 30	(-) 4 -	(+) 1 25
11	*Frankl* *Venham* *CFSS-DS*	(-) 4 33	(-) 4 -	(++) 1 19
12	*Frankl* *Venham* *CFSS-DS*	(-) 4 29	(-) 4 -	(+) 1 24
13	*Frankl* *Venham* *CFSS-DS*	(-) 5 30	(-) 5 -	(+) 2 25
14	*Frankl* *Venham* *CFSS-DS*	(-) 5 38	(-) 5 -	(-) 4 34
15	*Frankl* *Venham* *CFSS-DS*	(-) 5 32	(-) 5 -	(+) 2 23
16	*Frankl* *Venham* *CFSS-DS*	(-) 6 35	(-) 5 -	(+) 1 24
17	*Frankl* *Venham* *CFSS-DS*	(-) 5 36	(-) 5 -	(-) 4 33
18	*Frankl* *Venham* *CFSS-DS*	(-) 6 37	(-) 6 -	(+) 2 28
19	*Frankl* *Venham* *CFSS-DS*	(-) 5 35	(+) 2 -	(++) 1 21

20	*Frankl* *Venham* *CFSS-DS*	(-) 5 32	(+) 3 -	(++) 1 20
21	*Frankl* *Venham* *CFSS-DS*	(-) 5 37	(+) 3 -	(++) 1 21
22	*Frankl* *Venham* *CFSS-DS*	(-) 6 33	(-) 5 -	(+) 2 25
23	*Frankl* *Venham* *CFSS-DS*	(-) 5 29	(-) 5 -	(+) 1 24
24	*Frankl* *Venham* *CFSS-DS*	(+) 3 24	(+) 3 -	(++) 0 17
25	*Frankl* *Venham* *CFSS-DS*	(+) 3 29	(-) 4 -	(++) 1 20
26	*Frankl* *Venham* *CFSS-DS*	(+) 3 26	(+) 2 -	(++) 0 18
27	*Frankl* *Venham* *CFSS-DS*	(+) 2 23	(+) 2 -	(++) 0 19
28	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(+) 3 -	(++) 0 19

29	*Frankl* *Venham* *CFSS-DS*	(+) 3 28	(+) 3 -	(++) 1 20
30	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(+) 3 -	(+) 2 23
31	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(+) 2 -	(+) 1 23
32	*Frankl* *Venham* *CFSS-DS*	(+) 3 27	(+) 3 -	(+) 1 25
33	*Frankl* *Venham* *CFSS-DS*	(+) 3 26	(+) 3 -	(++) 1 20
34	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(-) 5 -	(++) 1 19
35	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(+) 3 -	(++) 0 20
36	*Frankl* *Venham* *CFSS-DS*	(+) 3 22	(+) 3 -	(+) 2 21
37	*Frankl* *Venham* *CFSS-DS*	(+) 2 23	(+) 2 -	(++) 0 20

38	*Frankl* *Venham* *CFSS-DS*	(+) 2 24	(+) 1 -	(++) 0 19
39	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(++) 1 -	(++) 1 22
40	*Frankl* *Venham* *CFSS-DS*	(+) 3 26	(+) 3 -	(++) 1 21
41	*Frankl* *Venham* *CFSS-DS*	(+) 2 24	(+) 2 -	(+) 0 24
42	*Frankl* *Venham* *CFSS-DS*	(+) 3 27	(+) 3 -	(++) 0 20
43	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(+) 3 -	(++) 0 19
44	*Frankl* *Venham* *CFSS-DS*	(+) 3 26	(+) 4 -	(++) 1 20
45	*Frankl* *Venham* *CFSS-DS*	(++) 1 19	(++) 1 -	(++) 0 19

ANNEXURE -8

MASTER CHART: GROUP-II

S.No	RATING SCALE	SESSION 1	SESSION 2	SESSION 3
1	*Frankl*	(--)	(--)	(--)
	Venham	7	6	6
	CFSS-DS	37	-	35
2	*Frankl*	(--)	(--)	(--)
	Venham	6	6	5
	CFSS-DS	37	-	37
3	*Frankl*	(--)	(--)	(--)
	Venham	7	7	7
	CFSS-DS	43	-	43
4	*Frankl*	(--)	(--)	(-)
	Venham	6	6	5
	CFSS-DS	35	-	30
5	*Frankl*	(-)	(-)	(+)
	Venham	4	3	1
	CFSS-DS	34	-	30
6	*Frankl*	(-)	(-)	(-)
	Venham	4	4	3
	CFSS-DS	35	-	33
7	*Frankl*	(-)	(+)	(+)
	Venham	5	3	2
	CFSS-DS	35	-	25
8	*Frankl*	(-)	(-)	(+)
	Venham	5	4	3
	CFSS-DS	33	-	25

9	*Frankl* *Venham* *CFSS-DS*	(-) 4 37	(-) 4 -	(-) 4 35
10	*Frankl* *Venham* *CFSS-DS*	(-) 5 35	(-) 5 -	(-) 3 33
11	*Frankl* *Venham* *CFSS-DS*	(-) 5 33	(-) 5 -	(-) 5 33
12	*Frankl* *Venham* *CFSS-DS*	(-) 5 32	(-) 5 -	(-) 4 30
13	*Frankl* *Venham* *CFSS-DS*	(-) 5 35	(+) 2 -	(+) 2 30
14	*Frankl* *Venham* *CFSS-DS*	(-) 5 35	(+) 3 -	(+) 3 26
15	*Frankl* *Venham* *CFSS-DS*	(-) 5 32	(-) 5 -	(+) 2 28
16	*Frankl* *Venham* *CFSS-DS*	(-) 5 30	(+) 3 -	(+) 3 25
17	*Frankl* *Venham* *CFSS-DS*	(-) 4 31	(-) 4 -	(-) 4 30

18	*Frankl* *Venham* *CFSS-DS*	(-) 4 30	(-) 4 -	(+) 3 25
19	*Frankl* *Venham* *CFSS-DS*	(-) 5 35	(-) 5 -	(+) 3 26
20	*Frankl* *Venham* *CFSS-DS*	(-) 4 30	(-) 4 -	(-) 4 28
21	*Frankl* *Venham* *CFSS-DS*	(-) 5 35	(-) 5 -	(-) 5 35
22	*Frankl* *Venham* *CFSS-DS*	(-) 4 30	(-) 4 -	(-) 4 28
23	*Frankl* *Venham* *CFSS-DS*	(-) 5 38	(-) 5 -	(+) 3 28
24	*Frankl* *Venham* *CFSS-DS*	(-) 5 33	(-) 4 -	(-) 4 30
25	*Frankl* *Venham* *CFSS-DS*	(+) 2 26	(+) 1 -	(+) 1 23

26	*Frankl* *Venham* *CFSS-DS*	(+) 2 25	(+) 1 -	(+) 2 25
27	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(+) 2 -	(+) 2 22
28	*Frankl* *Venham* *CFSS-DS*	(+) 3 28	(+) 2 -	(+) 1 25
29	*Frankl* *Venham* *CFSS-DS*	(+) 3 26	(+) 3 -	(+) 2 24
30	*Frankl* *Venham* *CFSS-DS*	(+) 3 24	(+) 3 -	(+) 3 25
31	*Frankl* *Venham* *CFSS-DS*	(+) 3 29	(+) 3 -	(+) 2 28
32	*Frankl* *Venham* *CFSS-DS*	(+) 3 23	(+) 3 -	(+) 3 23
33	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(+) 3 -	(+) 3 24

34	*Frankl* *Venham* *CFSS-DS*	(+) 2 24	(+) 2 -	(+) 2 24
35	*Frankl* *Venham* *CFSS-DS*	(+) 2 23	(+) 2 -	(+) 2 20
36	*Frankl* *Venham* *CFSS-DS*	(+) 3 24	(+) 2 -	(+) 2 24
37	*Frankl* *Venham* *CFSS-DS*	(+) 3 26	(+) 3 -	(+) 2 25
38	*Frankl* *Venham* *CFSS-DS*	(+) 3 28	(+) 3 -	(+) 2 23
39	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(+) 2 -	(+) 2 23
40	*Frankl* *Venham* *CFSS-DS*	(+) 2 23	(+) 2 -	(++) 0 20
41	*Frankl* *Venham* *CFSS-DS*	(+) 3 26	(+) 3 -	(+) 2 25

42	*Frankl* *Venham* *CFSS-DS*	(+) 2 25	(+) 2 -	(+) 2 21
43	*Frankl* *Venham* *CFSS-DS*	(+) 3 27	(+) 3 -	(+) 2 25
44	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(+) 3 -	(+) 2 25
45	*Frankl* *Venham* *CFSS-DS*	(++) 1 21	(++) 1 -	(++) 1 21

ANNEXURE-9

MASTER CHART: GROUP-III

S.No	RATING SCALE	SESSION 1	SESSION 2	SESSION 3
1	*Frankl*	(--)	(--)	(--)
	Venham	7	6	6
	CFSS-DS	39	-	39
2	*Frankl*	(--)	(--)	(--)
	Venham	6	6	6
	CFSS-DS	43	-	43
3	*Frankl*	(--)	(--)	(--)
	Venham	7	7	6
	CFSS-DS	41	-	40
4	*Frankl*	(--)	(--)	(-)
	Venham	7	5	5
	CFSS-DS	44	-	40
5	*Frankl*	(-)	(-)	(-)
	Venham	4	4	4
	CFSS-DS	35	-	35
6	*Frankl*	(-)	(-)	(-)
	Venham	5	5	5
	CFSS-DS	37	-	36
7	*Frankl*	(-)	(-)	(-)
	Venham	6	5	6
	CFSS-DS	32	-	32
8	*Frankl*	(-)	(+)	(+)
	Venham	5	4	3
	CFSS-DS	32	-	29
9	*Frankl*	(-)	(--)	(--)
	Venham	5	5	6
	CFSS-DS	34	-	42

10	*Frankl* *Venham* *CFSS-DS*	(-) 6 37	(-) 6 -	(-) 5 36
11	*Frankl* *Venham* *CFSS-DS*	(-) 4 29	(-) 4 -	(-) 4 29
12	*Frankl* *Venham* *CFSS-DS*	(-) 4 33	(-) 4 -	(-) 3 31
13	*Frankl* *Venham* *CFSS-DS*	(-) 5 34	(+) 4 -	(-) 5 35
14	*Frankl* *Venham* *CFSS-DS*	(-) 5 31	(-) 5 -	(-) 5 32
15	*Frankl* *Venham* *CFSS-DS*	(-) 5 36	(+) 4 -	(-) 5 36
16	*Frankl* *Venham* *CFSS-DS*	(-) 5 30	(-) 5 -	(-) 5 30
17	*Frankl* *Venham* *CFSS-DS*	(-) 5 35	(+) 4 -	(+) 4 29
18	*Frankl* *Venham* *CFSS-DS*	(-) 5 38	(-) 5 -	(-) 5 36

19	*Frankl* *Venham* *CFSS-DS*	(-) 5 30	(-) 5 -	(-) 4 30
20	*Frankl* *Venham* *CFSS-DS*	(-) 5 38	(-) 5 -	(-) 5 39
21	*Frankl* *Venham* *CFSS-DS*	(-) 5 34	(-) 6 -	(-) 5 34
22	*Frankl* *Venham* *CFSS-DS*	(-) 5 31	(-) 5 -	(-) 5 33
23	*Frankl* *Venham* *CFSS-DS*	(-) 6 35	(-) 5 -	(-) 6 35
24	*Frankl* *Venham* *CFSS-DS*	(-) 5 37	(+) 3 -	(-) 5 36
25	*Frankl* *Venham* *CFSS-DS*	(-) 4 36	(-) 4 -	(-) 4 36
26	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(+) 3 -	(+) 3 25
27	*Frankl* *Venham* *CFSS-DS*	(+) 2 25	(+) 2 -	(+) 5 30

28	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(+) 3 -	(-) 6 30
29	*Frankl* *Venham* *CFSS-DS*	(+) 4 28	(+) 4 -	(+) 4 28
30	*Frankl* *Venham* *CFSS-DS*	(+) 3 22	(+) 3 -	(+) 3 22
31	*Frankl* *Venham* *CFSS-DS*	(+) 2 26	(+) 2 -	(+) 2 25
32	*Frankl* *Venham* *CFSS-DS*	(+) 3 24	(+) 3 -	(+) 3 25
33	*Frankl* *Venham* *CFSS-DS*	(+) 2 22	(+) 2 -	(+) 2 22
34	*Frankl* *Venham* *CFSS-DS*	(+) 3 22	(+) 3 -	(+) 3 23
35	*Frankl* *Venham* *CFSS-DS*	(+) 2 24	(+) 2 -	(+) 2 23
36	*Frankl* *Venham* *CFSS-DS*	(+) 2 21	(-) 3 -	(+) 2 21

37	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(+) 3 -	(+) 3 25
38	*Frankl* *Venham* *CFSS-DS*	(+) 2 25	(+) 2 -	(-) 3 29
39	*Frankl* *Venham* *CFSS-DS*	(+) 2 23	(+) 2 -	(+) 2 23
40	*Frankl* *Venham* *CFSS-DS*	(+) 3 24	(+) 3 -	(+) 3 24
41	*Frankl* *Venham* *CFSS-DS*	(+) 1 23	(+) 1 -	(+) 2 25
42	*Frankl* *Venham* *CFSS-DS*	(+) 2 28	(+) 2 -	(-) 3 30
43	*Frankl* *Venham* *CFSS-DS*	(+) 3 25	(-) 5 -	(-) 5 30
44	*Frankl* *Venham* *CFSS-DS*	(+) 2 27	(+) 2 -	(+) 2 26
45	*Frankl* *Venham* *CFSS-DS*	(++) 1 20	(++) 1 -	(++) 1 20

FIGURE 1: INSTRUMENTS AND MATERIALS

GROUP I: TREATMENT SESSIONS

FIGURE 4A: CHILD SHOWING NEGATIVE BEHAVIOUR (FRANKL'S RATING 2) DURING SESSION 1

FIGURE 4B: CHILD VIEWING MODELING FILM

FIGURE 4C: CHILD EXHIBITING DEFINITELY POSITIVE BEHAVIOUR (FRANKL'S RATING 4) DURING SESSION 3

GROUP II: TREATMENT SESSIONS

FIGURE 5A: CHILD SHOWING POSITIVE BEHAVIOUR (FRANKL'S RATING 3) DURING SESSION 1

FIGURE 5B: CHILD VIEWING CARTOON FILM

FIGURE 5C: CHILD EXHIBITING POSITIVE BEHAVIOUR (FRANKL'S RATING 3) DURING SESSION 3

GROUP III: TREATMENT SESSIONS

FIGURE 6A: CHILD SHOWING NEGATIVE BEHAVIOUR (FRANKL'S RATING 2) DURING SESSION 1

FIGURE 6B: CHILD EXHIBITING NEGATIVE BEHAVIOUR (FRANKL'S RATING 2) DURING SESSION 3

FIGURE 2: CHILD CHOOSING A FIGURE FROM PICTURE CARDS REPRESENTING VENHAM'S PICTURE TEST

FIGURE 3: PARENT FILLING OUT A QUESTIONNAIRE CONTAINING THE CHILDREN'S FEAR SURVEY SCHEDULE - DENTAL SUBSCALE (PARENTAL VERSION)

GROUP I: TREATMENT SESSIONS

FIGURE 4A: CHILD SHOWING NEGATIVE BEHAVIOUR (FRANKL'S RATING 2) DURING SESSION 1

FIGURE 4B: CHILD VIEWING MODELING FILM

FIGURE 4C: CHILD EXHIBITING DEFINITELY POSITIVE BEHAVIOUR (FRANKL'S RATING 4) DURING SESSION 3

GROUP II: TREATMENT SESSIONS

FIGURE 5A: CHILD SHOWING POSITIVE BEHAVIOUR (FRANKL'S RATING 3) DURING SESSION 1

FIGURE 5B: CHILD VIEWING CARTOON FILM

FIGURE 5C: CHILD EXHIBITING POSITIVE BEHAVIOUR (FRANKL'S RATING 3) DURING SESSION 3

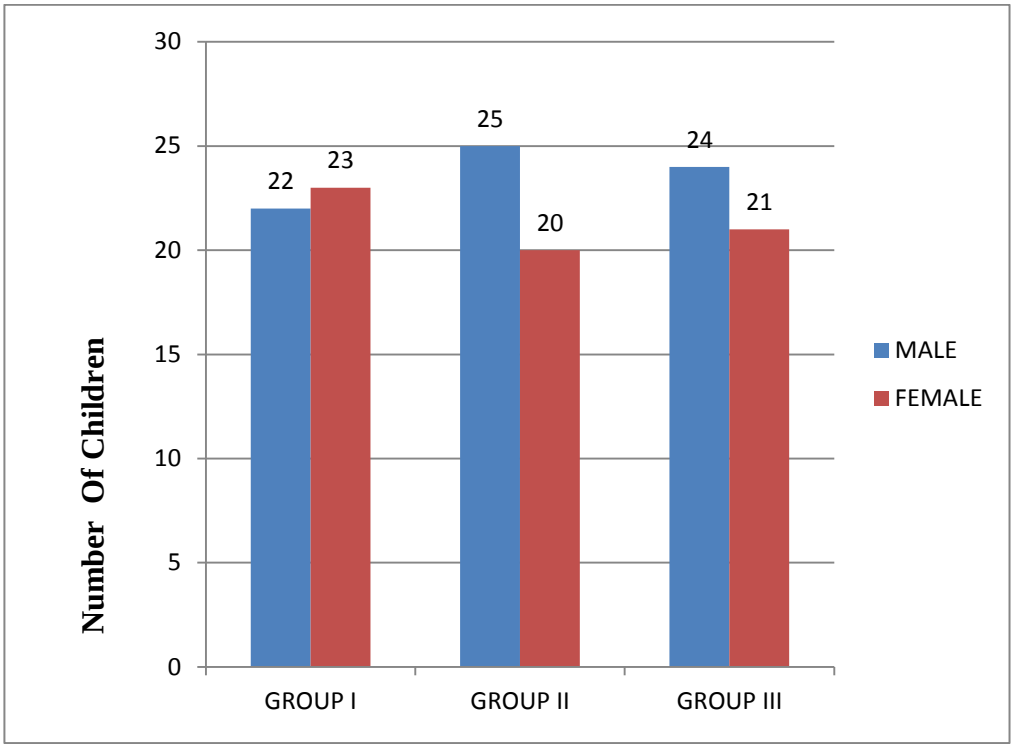
GROUP III : TREATMENT SESSIONS

FIGURE 6A: CHILD SHOWING NEGATIVE BEHAVIOUR (FRANKL'S RATING 2) DURING SESSION 1

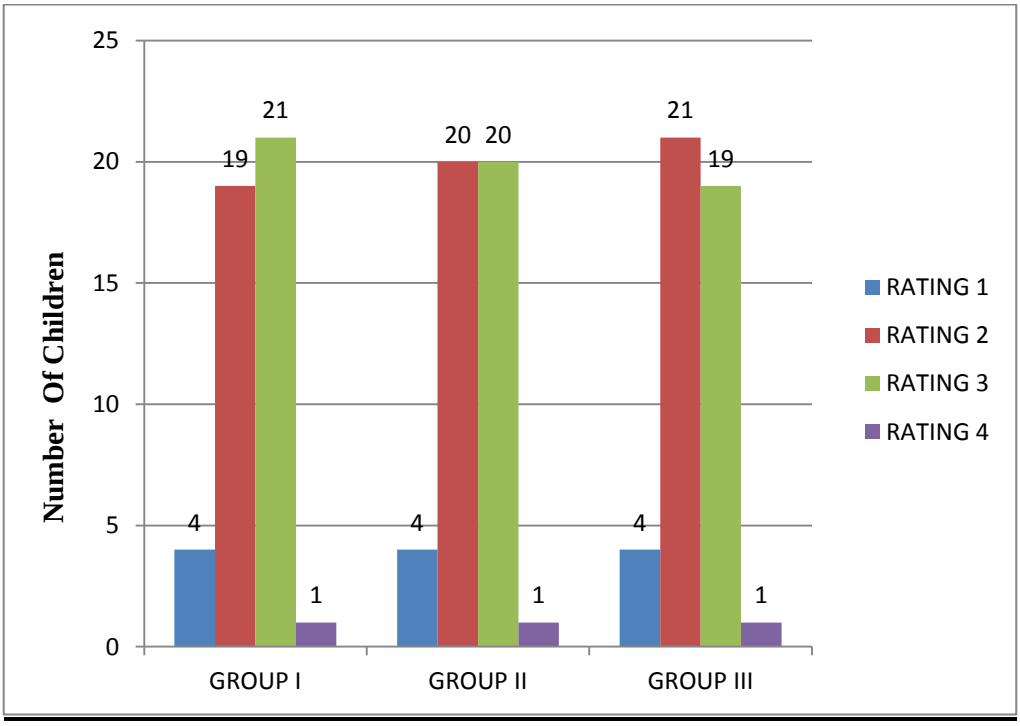
FIGURE 6B: CHILD EXHIBITING NEGATIVE BEHAVIOUR

(FRANKL'S RATING 2) DURING SESSION 3

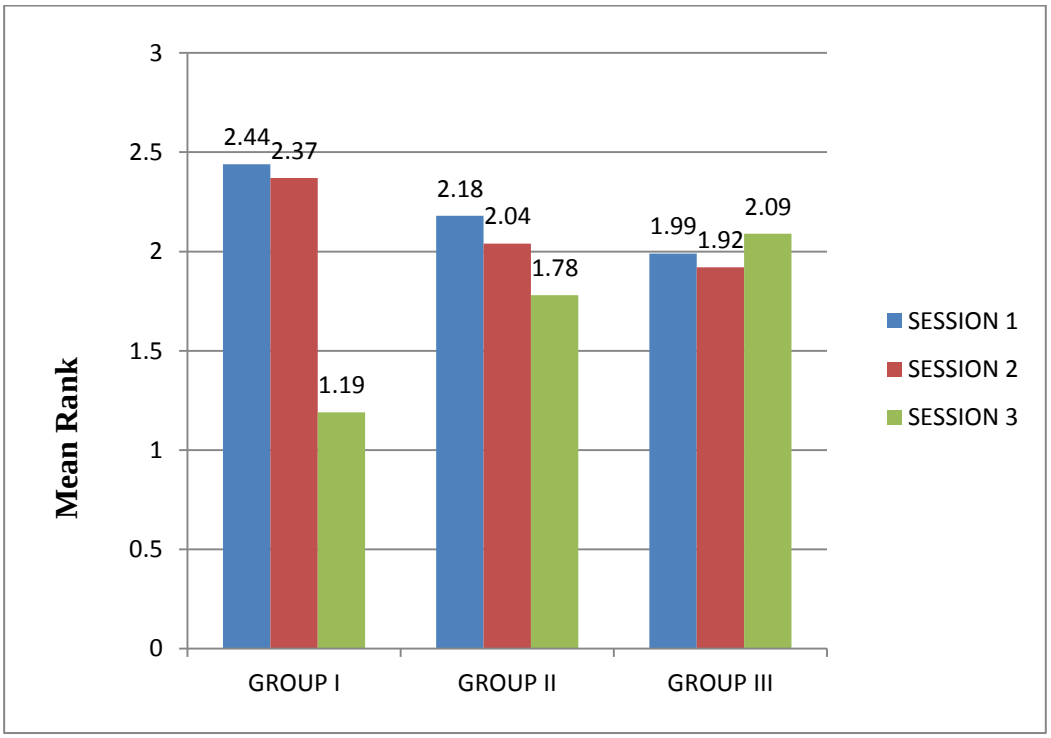
GRAPH 1: DISTRIBUTION OF THE STUDY POPULATION ACCORDING TO GENDER



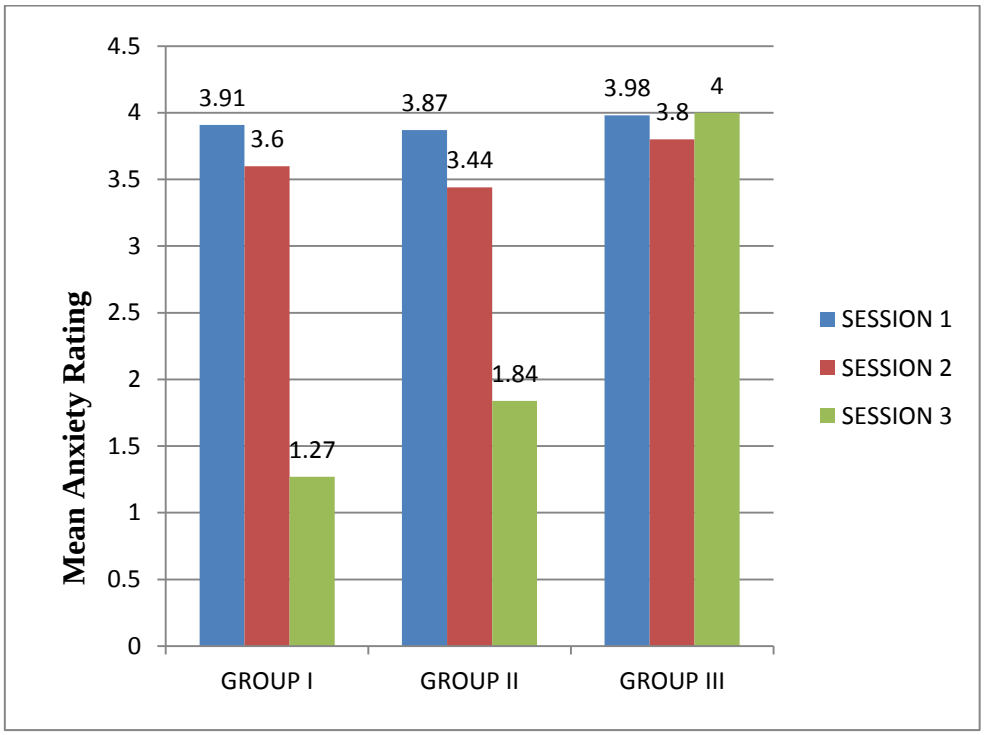
GRAPH 2: DISTRIBUTION OF THE STUDY POPULATION ACCORDING TO THEIR BASELINE FRANKL'S BEHAVIOUR RATING



GRAPH 3: COMPARISON OF THE CHILD'S BEHAVIOUR ACCORDING TO THE MEAN RANK OF FRANKL'S BEHAVIOUR RATING BETWEEN THE STUDY GROUPS DURING THE EXPERIMENTAL PERIOD



GRAPH 4: COMPARISON OF THE MEAN ANXIETY RATING BETWEEN THE STUDY GROUPS DURING THE EXPERIMENTAL PERIOD



GRAPH 5: COMPARISON OF THE MEAN FEAR SCORES (CFSS-DS) BETWEEN THE STUDY GROUPS DURING THE EXPERIMENTAL PERIOD